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# Depot Maintenance Consolidation Study



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THE JOINT STAFF  
WASHINGTON, D.C.

26 JAN 1993

General Colin L. Powell, USA  
Chairman of the Joint Chiefs of Staff  
The Pentagon  
Washington, DC 20318-0001

Dear General Powell,

Attached is our report on Depot Maintenance Consolidation. On 26 January 1993, in a public meeting, the Executive Working Group met for the final time. The meeting was attended by thirty-seven members of government and private industry. A roster of those who attended is included in the study report as Appendix N. Of specific concern to a number of those attendees was that the study's scope was too narrow because it did not consider the total industrial base, public and private. This concern is understood, but it was beyond the scope of this study. It is worthy of further consideration by the Department of Defense.

Respectfully yours,

GEN LOUIS J. WAGNER,  
USA (Ret), Member

GEN BRYCE POE,  
USAF (Ret), Member

VADM EUGENE A. GRINSTEAD  
USN, (Ret), Member

JOHN J. MCCARTHY, Industry Member

J. J. WENT  
General, USMC (Ret)  
Director, Depot Maintenance  
Consolidation Study



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WASHINGTON, DC

General Colin L. Powell, USA  
Chairman of the Joint Chiefs of Staff  
The Pentagon  
Washington, DC 20318-0001

02 DEC 1992

Dear General Powell,

Attached is our report on Depot Maintenance Consolidation. The information and views contained in the Executive Summary and the chapters on conclusions and recommendations are strictly the independent views of the Executive Working Group. The discussions and analysis contained throughout the remainder of this report reflect the efforts of the support staff, which was made-up predominantly of uniformed personnel from the Joint Staff. The Service Working Group, comprising of representatives from the individual Services, served as the principal source of information contained in this report. No attempt has been made to seek Joint Staff or Service concurrence.

We believe that this report reflects the most rigorous analysis of depot maintenance to date. Nevertheless, we would caution that this total effort was accomplished in approximately eight weeks. That is hardly enough time to thoroughly examine an enterprise that would rank in the top 30 companies of the Fortune 500, if it were a commercial business. Thus, we do not believe this report should be used to make detailed organizational decisions or resource allocations, but we do believe it will be valuable in helping to set a conceptual direction for the future, with implementing details to be developed through additional analysis and negotiation between the principals concerned.

Respectfully yours,

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## Executive Summary

**Background.** Over the course of many years, with constant change in the way we equip our fighting forces, the Services have developed maintenance systems which have provided those fighting forces with the right kind of equipment, in first class condition, when and where needed. As a result of a changing world and changing requirements, the Department of Defense now finds itself with more depot maintenance capacity than needed. The purpose of this study is to help identify the best way to scale down that excess capacity and reduce costs without degrading current or future capability to meet our peacetime and wartime needs. Further, this study examines whether we are organized in a way that will enable us to act quickly and decisively and, if not, recommend a better organizational arrangement.

Our study group visited a sampling of Service maintenance depots, talked with the Services' leadership, talked with customers of the depots, and examined a great deal of historical material that has been written about depot maintenance. We examined seven management alternatives that were developed by the Joint Staff. The alternatives were examined against a set of criteria that included cost savings, capacity reduction, unnecessary duplication and military responsiveness. We viewed the seven alternatives not as precise, organizational blueprints, but simply as frameworks upon which to do comparative analysis. Such analysis led us to a variation of one of the seven alternatives which ultimately resulted in our recommendation.

In all cases, this study only examines depot level maintenance and does not suggest in any way changing individual Service responsibility for integrated weapon system management. Before we discuss any conclusions or recommendations we want to make clear that we have a great deal of empathy with Service Chiefs, who are legitimately concerned about their continuing ability and accountability to provide for ready fighting forces. We understand that they would be particularly concerned if they were to lose close control over the maintenance of their equipment.

Currently, when an operational unit is not served well by the maintenance system, a Service Chief has authority to make changes, reorder priorities and resources, and redirect efforts to correct problems or inequities. Similarly, operating units have established good working relationships with their individual maintenance activities. They are in continuous negotiations to accommodate each other's problems which usually involve money, time, quantity, and priorities. Because of these very real and legitimate Service concerns, we have strived to identify a maintenance system that preserves and strengthens the close ties between warfighters and "maintainers."

Most of the alternatives examined do not produce substantial savings or significant reductions in excess capacity and unnecessary duplication. Therefore, while each of these alternatives

are discussed in the body of the study, we believe that there are basically only three options which are serious challengers to the way we currently perform depot maintenance. They are:

- Executive Service, or sometimes called Single Service, management of depot level maintenance by major weapon systems categories.
- Consolidation of all depot maintenance activities under a single Defense Maintenance Agency.
- Consolidation of all depot maintenance activities under a Joint Depot Maintenance Command.

We recognize that full contracting out of depot maintenance functions to commercial industry is also a long-term possibility. Since more or full commercial maintenance of Service equipment could evolve from any of the preceding approaches, it is not discussed in great detail herein. Because it involves the larger question of preserving the industrial base and more flexibility in work force levels, the whole issue of contracting out deserves further study in the future.

**Conclusions and Recommendations.** The current depot management structure in DOD and the Services has not resulted in substantial competition, interservicing, reduction of capacity or duplication of effort. There is nothing to indicate that continuation of the current way of doing business will result in any significant departure from past performance.

We believe that the DOD currently has 25 to 50 percent more depot capacity than the Department will need in the future and unnecessary duplication exists throughout the individual Service depots, especially when viewed across Service boundaries. Closure of a significant number of depots will be necessary if we are to reduce excess capacity. We believe the only effective way to close depots is through the Base Realignment and Closure (BRAC) process. The BRAC process should be a coordinated effort across Service lines that integrates requirements and accurately reflects unneeded facilities. This action must start immediately because of the necessity to provide recommendations to the 1993 BRAC Commission in the next few months.

Elimination of unnecessary capacity and duplication has the potential for substantially reducing long-term costs. We emphasize long-term because savings from depot closures, for example, will not begin for three to seven years and will take several years to produce maximum savings. The precise value of savings that may be achieved cannot be determined because of all of the variables and dynamics involved. A rough estimate ranges from a low of two to a high of nine billion dollars over the next ten years. We are confident, however, that savings will be optimized only if consolidations are maximized and begin as soon as possible with associated workload shifts occurring over the shortest possible period of time. The total savings will depend upon the alacrity with which decisions are made and willingness

to make up front investments. No attempt has been made to allocate potential savings to the individual Services.

We believe that any change in organizational structure and management of depot activities must consider and accommodate the legitimate concerns of the customers. Of the three final alternatives examined, only one results in substantial cost savings, excess capacity reduction and elimination of unnecessary duplication while fully satisfying the need for close ties between the warfighters and the "maintainers."

We recommend the establishment of a unified command for depot maintenance with full authority to organize current Service depots as determined by the new command and as approved by the Joint Chiefs of Staff. We believe that a Joint Depot Maintenance Command will produce the greatest opportunities for responsiveness, efficiency and matching capacity with future requirements. Since it would be a unified command with Service components it does not appear that any change to Title 10, U.S. Code responsibilities is required. Changes may be required to the responsibilities specified in DOD directives that prescribe Service functions.

A full discussion and listing of over a dozen conclusions and our recommendations can be found in Chapters V and VI of this report.

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## **Depot Maintenance Consolidation Study**

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## CHAPTER I - INTRODUCTION

1. **Roles and Missions.** Department of Defense (DOD) Directive 5100.1, *Functions of the Department of Defense and Its Major Components*, assigns the Army, Navy, Air Force, and Marine Corps, under their respective Secretaries, the responsibility for, "Providing logistic support for Service forces, including procurement, distribution, supply, equipment, and maintenance, unless otherwise directed by the Secretary of Defense." To meet the responsibility to maintain its equipment, each Service operates a depot maintenance system.

2. **Setting the Stage.** Depot maintenance is a key part of the total DOD maintenance effort and is a vast undertaking supporting over 700,000 pieces of equipment: 36,000 combat vehicles, 660,000 wheeled vehicles, 500 ships, and 20,200 aircraft of over 100 different models. Depot maintenance requires extensive shop facilities, specialized equipment, and highly skilled technical and engineering personnel to perform major overhaul of parts or completely rebuild parts; assemblies, subassemblies, and end-items. This includes reverse engineering and manufacturing/remanufacturing of parts, modifications, testing, and reclamation. Depot maintenance also requires the flexibility to accommodate readiness changes and problems relating to safety of flight maintenance or inspection, scheduling maintenance to maintain alert capabilities, and particularly, the ability to surge to meet contingency requirements.

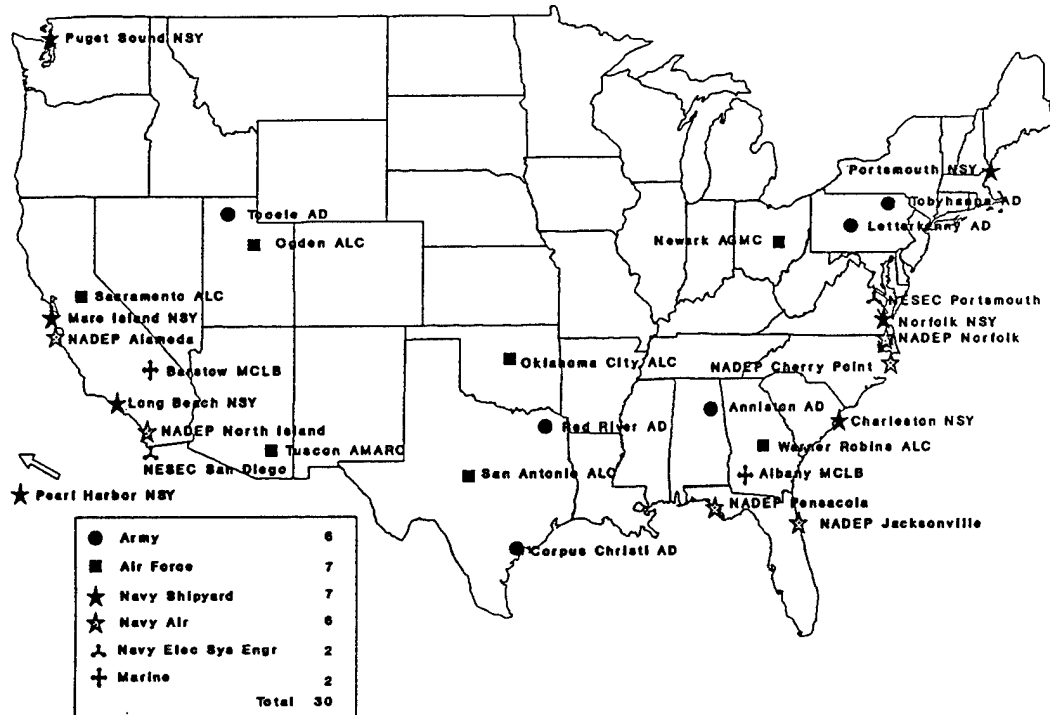
a. The depot maintenance business environment within DOD is complex and, by necessity, not a monolithic entity. The Services not only have multiple, diverse products, but they also have independently developed different depot maintenance management approaches to meet their unique requirements. The work done is not limited to the basic depot facilities but is carried out by teams dispatched to, or resident at, stations and ships worldwide. Additional work is performed under contract in the Continental US (CONUS) and overseas. It is important to recognize that depot maintenance is not only big business and complex but that it is not discrete and separate from the material management function. Depot maintenance is an integral part of cradle-to-grave, integrated weapons system management. Among other things, this involves design, test and evaluation, reliability centered maintenance, and in-service engineering.

b. The DOD depot maintenance system employs about 130,000 DOD civilian personnel and nearly 2,000 military personnel. There are 29 major DOD depot maintenance facilities consisting of Army depots, Air Force air logistics centers (ALC), Naval aviation depots (NADEP), Naval shipyards (NSY), Naval electronic systems engineering centers, and Marine Corps logistics bases (MCLB) that perform depot maintenance (Figure I-1). There are also sixteen Army and nine Navy facilities in CONUS for weapons and munitions depot maintenance. They are listed in Appendix M.

c. Annually, DOD spends about 13 billion dollars for depot maintenance operations with about 70 percent of this expenditure accomplished in DOD facilities and the balance by contractors. Data for FY89-FY97 are shown in Table I-1. Figures I-2, I-3, and I-4 depict

the FY86-FY90 average Service cost share of depot maintenance, costs by major commodity, and the FY90 distribution by cost elements.

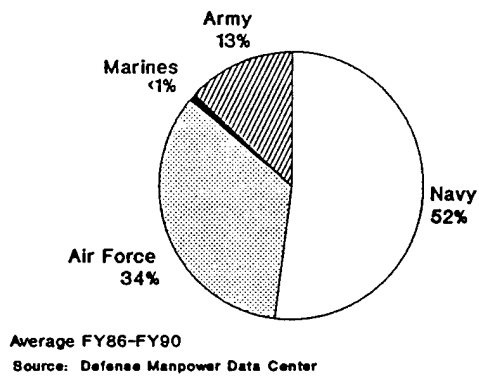
**Figure I-1 Defense Depot Maintenance Facilities**



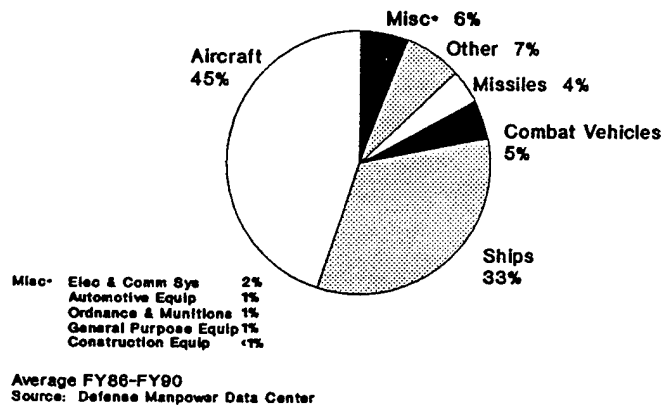
**Table I-1 Current Estimate of Depot Maintenance Budget**

(Then Year \$Millions)		FY89	FY90	FY91	FY92	FY93	FY94	FY95	FY96	FY97
Army	Organic	1,016.8	1,121.7	1,301.0	1,316.1	1,111.6	1,053.2	1,014.6	1,028.3	954.4
	Contract	541.2	528.2	946.0	852.7	738.2	617.5	711.1	591.5	546.8
	Total	1,558.0	1,649.9	2,247.0	2,168.8	1,849.8	1,670.7	1,725.7	1,619.8	1,501.2
Navy	Organic	4,468.6	4,918.0	4,615.6	4,839.6	4,788.4	4,857.9	5,340.1	5,388.1	5,411.0
	Contract	1,921.7	2,155.1	2,531.8	2,743.9	2,303.5	2,046.7	2,187.4	2,241.1	2,256.3
	Total	6,390.3	7,073.1	7,147.4	7,583.5	7,091.9	6,904.6	7,527.5	7,629.2	7,667.3
Air Force	Organic	2,618.6	2,442.1	2,568.7	2,682.4	2,791.3	2,801.4	2,820.5	2,732.4	2,751.6
	Contract	1,850.6	1,687.2	1,286.4	1,144.5	1,134.1	1,017.7	909.1	970.5	986.3
	Total	4,469.2	4,129.3	3,855.1	3,826.9	3,925.4	3,819.1	3,729.6	3,702.9	3,737.9
Marines	Organic	84.0	72.3	135.0	232.8	56.2	94.5	99.9	116.0	166.3
	Contract	4.4	3.1	4.2	5.1	6.8	5.7	5.4	5.4	5.4
	Total	88.4	75.4	139.2	237.9	63.0	100.2	105.3	121.4	171.7
TOTAL	Organic	8,188.0	8,554.1	8,620.3	9,070.9	8,747.5	8,807.0	9,275.1	9,264.8	9,283.3
	Contract	4,317.9	4,373.6	4,768.4	4,746.2	4,182.6	3,687.6	3,813.0	3,808.5	3,794.8
	Total	12,505.9	12,927.7	13,388.7	13,817.1	12,930.1	12,494.6	13,088.1	13,073.3	13,078.1
Source: FY89/90		FY90/FY91 Program Objective Summary, JDMAG								
FY91-97		Table 1-2, DDMC Corporate Business Plan (FY92-97), Oct 92 (Draft)								

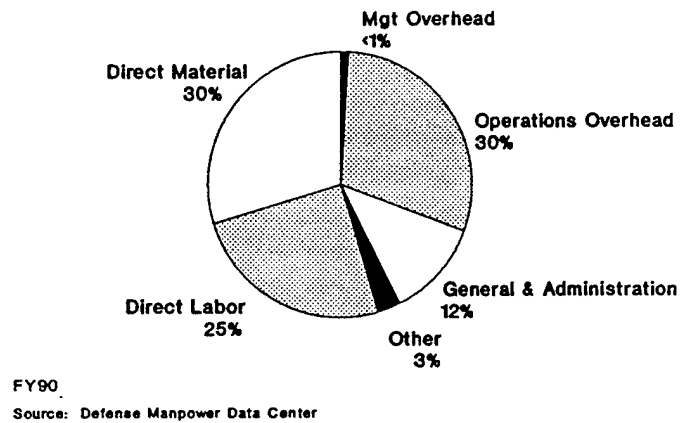
**Figure I-2 Depot Maintenance Service Cost Share**



**Figure I-3 Depot Maintenance Commodity Cost Share**

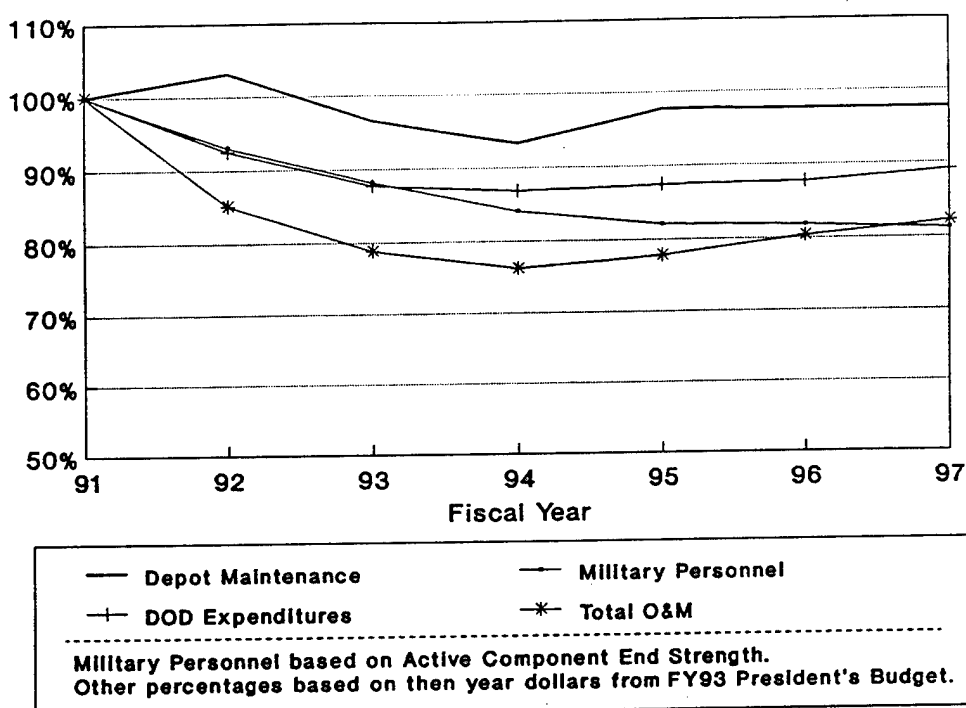


**Figure I-4 Distribution of Depot Maintenance Costs**



d. With the easing of geopolitical tensions and reduced defense budgets, the force structure is downsizing to the Base Force level and operating tempos are being reduced in many cases. Figure I-5 illustrates the percent change from the FY91 to FY97 programmed levels for depot maintenance expenditures, active component military personnel strength levels, DOD total expenditures, and DOD Operation and Maintenance (O&M) expenditures. While depot maintenance expenditures appear to remain relatively stable during this period, the other categories reflect the downsizing of the Department.

**Figure I-5 Defense Programs (Percent Change from FY91)**



3. **Past Efforts To Improve Depot Maintenance Efficiency.** Since the early 1960s, the Services, the Office of the Secretary of Defense (OSD), and external agencies and commissions have undertaken numerous management initiatives, studies, and audits with recommendations for improving depot maintenance effectiveness and economies. These include standardizing cost accounting and reporting systems, increasing interservicing and competition, and varying degrees of depot maintenance modernization and centralization. Although these efforts resulted in some improvements, excess capacity, unnecessary duplication, and inefficiencies still exist.

a. Some of the earlier DOD efforts were:

- (1) Calling for comparable and reliable cost accounting, performance measurement reporting, and capacity measurement. Universally accepted, standardized procedures have not yet been developed.

(2) Directing the Services to take advantage of the facilities and capabilities of the other Services through interservicing agreements and having depots and private industry compete for work. Some progress has been made in this regard but in FY91 interservicing was only about 3 percent of the total depot budget and savings attributed to competition were only 0.5 percent of the FY91 depot budget.

(3) Consolidating some engine and avionics maintenance in the Air Force and Navy. The consolidation efforts fell short of the recommendations of the 1970 Blue Ribbon Defense Panel's *Report to the President* for a unified logistics command and a 1973 General Accounting Office (GAO) report recommendation to assign a single manager for maintenance of specific classes of supply.

b. The Joint Logistics Commanders (JLC) have provided senior-level guidance and priorities for joint initiatives and efforts to improve depot maintenance. Current JLC membership is the Commander, US Army Materiel Command; the Commander, Air Force Materiel Command; the Deputy Chief of Naval Operations (Logistics); the Deputy Chief of Staff for Installations and Logistics, Headquarters, US Marine Corps; and the Director, Defense Logistics Agency. In March 1980, the JLC established an organization that evolved into the Joint Depot Maintenance Analysis Group (JDMAG) to expedite cross-service coordination and to assimilate other advantages of a single manager, but have consistently maintained that each of the Services must retain management control of their respective depots.

c. In June 1990, dissatisfied with progress, the Deputy Secretary of Defense (DepSecDef) concluded that substantial opportunities existed to increase the efficiency and reduce the cost of the Department's depot maintenance activities while continuing to effectively conduct their maintenance mission. He directed the Service Secretaries to develop near-term and long-range plans for increased efficiency, including single-siting of workloads in the Air Force and Naval air depots, and a plan for improved maintenance information management. In addition, he established a Defense Depot Maintenance Council (DDMC) to advise the Assistant Secretary of Defense for Production and Logistics on depot maintenance management within DOD. The DDMC serves as a mechanism for coordinated reviews of DOD depot maintenance policies, systems, programs, and activities and provides advice on initiatives for reducing costs. It is the mechanism for jointly planning, monitoring, and evaluating the implementation of management improvement initiatives. The DDMC is composed of the Deputy Assistant Secretary of Defense (Logistics) and the JLC, who, in this case, are the designated representatives of the Service Secretaries. Under the direction and sponsorship of the JLC, the Services began execution of the DDMC strategy to increase depot efficiency and productivity by streamlining, restructuring, and consolidating functions, while preserving the capability needed to ensure equipment and weapon system readiness.

d. The Service Under Secretaries identified near-term streamlining plans that would save 1.7 billion dollars over the period FY91-95. The DDMC formed Joint-Service study



groups to examine 18 specific commodity areas (fixed wing aircraft, ground communications and electronics, small arms, etc.) to identify potential economies and efficiencies that the Services could achieve through both unilateral and coordinated actions. Based on the findings and recommendations of the commodity studies, the Service Secretaries, in their *Joint Services Business Plan*, dated February 1991, jointly agreed to specific actions which would result in savings of 1.15 billion dollars during the period FY91-FY95. The majority of the savings are from unilateral actions and include a total of 0.263 billion dollars resulting from interservicing. Separate joint-service study groups also looked at four general management areas: cost comparability, performance measurement, capacity/utilization measurement, and maintenance information management. As a result of these four general studies, OSD has published a cost comparability handbook, developed a system to measure performance that is consistent with Total Quality Management, published a production shop capacity measurement handbook, and established the Joint Logistics Systems Center as the DOD executive agent for depot maintenance systems.

e. The Service Under Secretaries then prepared a Corporate Business Plan (CBP) that accumulated, in one document, their entire plan for saving 3.9 billion dollars over the period FY91-97. The CBP includes the 1.7 billion dollars near-term savings, the 1.15 billion dollars of savings associated with the commodity studies, and 1.1 billion dollars of other savings.

f. The Defense Management Review process has resulted in two decisions with direct impact on depot maintenance. Defense Management Report Decision (DMRD) 908, dated 17 November 1990, and DMRD 908C, dated 12 January 1991, *Consolidating Depot Maintenance*, formalized the 6.4 billion dollars savings from FY91-FY97 recommended by the Service Under Secretaries to the Assistant Secretary of Defense for Production and Logistics in the CBP. (The 1.15 billion dollars commodity area savings described in the preceding paragraph have been subsumed into the CBP savings.) The annual DDMC CBP describes the joint Service strategy for managing the organic depot maintenance industrial base and achieving these savings. The 1992 CBP is, by far, the most aggressive promulgated to date. Near-term savings will result from downsizing both direct and indirect work forces, closure of facilities, cancellation of facility projects, and internal Service workload consolidations, including single-siting workload in the NADEPs. Projected near-term savings are 3.2 billion dollars. Long-range actions under consideration include increased interservicing, increased competition, and improved capacity utilization. Interservicing savings projected to be 134.7 million dollars accrue from greater economies of scale through consolidations, which reduce recurring cost to the gaining depot. The losing activity will realize savings through reduced overhead associated with reduced workload and facility downsizing. Competition among the depots and between depots and private business is projected to provide savings of 1.73 billion dollars. Capacity utilization savings of 1.28 billion dollars will be achieved through redistribution of workloads within and among the Services. The projected savings by Service are shown in Table I-2. In reality, it is highly unlikely that the Services will be

able to meet these savings without actions that will severely affect readiness and the ability to go to war.

**Table I-2 Projected Joint Service Savings**

(\$ Millions)	<u>FY91*</u>	<u>FY92</u>	<u>FY93</u>	<u>FY94</u>	<u>FY95</u>	<u>FY96</u>	<u>FY97</u>	<u>Total</u>
Army	6.2	21.1	60.0	206.9	228.4	262.8	280.4	1,065.8
Navy	274.0	392.5	513.8	614.4	755.7	543.6	462.8	3,556.8
Air Force	58.4	149.3	235.5	299.8	367.4	292.7	305.2	1,708.3
Marine Corps	1.1	4.5	3.8	6.1	4.5	4.4	4.2	28.6
Total	339.7	567.4	813.1	1,127.2	1,356.0	1,103.5	1,052.6	6,359.5

\* FY91 column reflects near-term savings achieved which exceeded the FY91 target of \$258.8 million by \$80.9 million.

Source: DDMC Corporate Business Plan (FY92-97), Oct 92 (Draft)

**4. Study Objective.** The Depot Maintenance Consolidation Study was chartered by the Chairman of the Joint Chiefs of Staff (CJCS) in September 1992 and was led by a group composed of one retired senior officer from each Service and a retired representative from industry. The purpose of the study was threefold:

- a. To review the existing depot maintenance structure in each DOD Service and the Coast Guard.<sup>1</sup> A summary of this review is presented in Chapter II.
- b. To identify and analyze alternatives for reducing costs, duplication, overlap, and overall depot maintenance capacity. Analysis methodology is summarized in Chapter III and the analysis of seven alternatives is presented in Chapter IV.
- c. To recommend cost effective alternative(s) to reduce duplication, overlap, and overall depot maintenance capacity. Any recommendation made must ensure that the depots will be able to support peacetime readiness requirements, sustain forces during crisis response and contingency operations, and return equipment to established readiness standards upon redeployment. Conclusions and recommendations are included in Chapters V and VI.

<sup>1</sup> As the study progressed it became apparent that because of the unique mission and relatively small requirement, there is no utility in consolidating Coast Guard depot maintenance activities into the DOD system. The Coast Guard currently does maintenance in-house or contracts out to commercial industry or the DOD, whichever is least costly and most responsive to their needs. Accordingly, no recommendations are made regarding Coast Guard depot maintenance.

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## CHAPTER II - TODAY'S DEPOT MAINTENANCE ENVIRONMENT

1. **Introduction.** This chapter provides a brief description of the Services' current depot maintenance facilities and discusses the history of Service efforts to reduce the cost of depot maintenance. It also addresses opportunities for further cost efficiency and the potential for increased savings from interservicing, competition, and capacity reduction.

2. **Depot Facilities Description.** The following data on each Service's depot maintenance command structure and depot facilities were obtained from Service inputs and the JDMAG 1991 Depot Profiles.

a. **Army.** Army depot maintenance is controlled by the Army Materiel Command (AMC) through the Depot System Command (DESCOM) and Major Subordinate Commands (MSC). DECOM operates the depots and designates a prime depot for every item requiring maintenance. DECOM also designates depots as "Centers of Excellence" for specific commodities such as electronics or gas turbine engines. MSCs are responsible for maintenance of specific commodities, and coordinate their requirements for depot support through AMC and DECOM to ensure maximum benefit from the "Centers of Excellence" concept. During conflicts, Army depot maintenance teams deploy to the scene to repair battle-damaged equipment in order to avoid returning equipment to a depot. Table II-1 presents basic information on each Army depot. As noted in Chapter I, the Army also maintains sixteen munition depots for ammunition storage and maintenance on US territory. Depot maintenance data on these depots was not available. Army munitions depot consolidation recommendations will require in-depth consideration of maintenance requirements, allowable explosive concentrations, and transportation limitations. They are beyond the scope of this study. Sacramento Army Depot is also not listed as it will be closed in FY95.

Table II-1 Army Maintenance Depots

DEPOT CODE	SIZE (SF)	COST (\$M) Facility/ Equipment	FY93/FY95 Workload (KDLH)	TYPE OF WORK
Anniston, AL--ANAD	1.5M	138/117	3285/1956	Tanks, Small Arms, Ammo
Corpus Christi, TX--CCAD	2.2M	362/93	4244/4430	Helos
Letterkenny, PA--LEAD	1.4M	600/150	2140/2679	Tac MsIs, Ammo
Red River, TX--RRAD	1.4M	855.2/137	2794/2733	Lt Cmbt Veh, Ammo
Tobyhanna, PA--TOAD	1M	220/90	3268/3606	Electronics
Tooele, UT--TEAD	.95M	1700/23	1356/1068	Tac Veh, Rail

b. **Navy.** The Chief of Naval Operations (CNO) controls Navy depot maintenance through the Naval Air Systems Command (NAVAIR) for aircraft, the Naval Sea Systems Command (NAVSEA) for ships, and the Space and Naval Warfare Systems Command (SPAWAR) for space, surveillance, communications, and computer electronics. Each of

these three commands is responsible for the depot maintenance of its platforms and operates depots to accomplish the work mostly independent of other facilities. Navy aviation depots are being reorganized along commodity lines to reduce redundant facilities. Like the Army, Navy aviation depots and shipyards provide field support to forward-deployed activities during conflicts. Naval aircraft depot maintenance is normally performed ashore but, in the event of a conflict, depot teams can deploy with each aircraft carrier to repair depot-level battle damage aboard ship. Shipyard engineering and repair teams also forward deploy as needed to repair major equipment casualties on scene without requiring that the damaged ship withdraw to a Navy shipyard. Tables II-2, II-3, and II-4 present basic information on each of the depots. As discussed in Chapter I, there are also nine Navy facilities operated by NAVSEA in CONUS that perform weapons maintenance and will be considered for consolidation by this study. Philadelphia Naval Shipyard, which has four usable drydocks, is not listed as it will be closed by FY96.

**Table II-2 NAVAIR Maintenance Depots**

DEPOT CODE	SIZE (SF)	COST (\$M) Facility/ Equipment	FY93/FY95 Workload (KDLH)	TYPE OF WORK
Alameda, CA--NADEP-ALMD	2.3M	246/183	2515/2438	Acft, Eng, Avionics, Msls, Armament
Cherry Pt., NC--NADEP-CHYPT	1.5M	274/250	2591/2028	Acft, Helos, Eng, Blades/Vane
Jacksonville, FL--NADEP-JX	1.6M	394/250	2583/2240	Acft, Eng, E-O, Avionics
Norfolk, VA--NADEP-NORVA	2.3M	356/297	3373/2802	Acft, CV Support, Hyd Sys
North Island, CA--NADEP-NORIS	2.5M	287/288	2545/2478	Acft, ATE, Avionics, CV Support, Metrology
Pensacola, FL--NADEP-PNCLA	1.7M	214/218	2871/2817	Acft, Generators Helos, Avionics

**Table II-3 NAVSEA Shipyards**

DEPOT CODE	# DRY-DOCKS	COST (\$M) Facility/ Equipment	FY93/FY95 Workload (KDLH)	TYPE OF WORK
Charleston, SC--CHNSY	3	1702/220.5	7112/6406	Nuc Ships, Subs
Long Beach, CA--LBNSY	3	2236/281.4	3990/3636	Non-Nuc Ships, CV
Mare Island, CA--MINSY	4	2253/331.8	6778/6764	Nuc Ships, Subs
Norfolk, VA--NNSY	4	2497/216.3	10485/9142	Nuc Ships, Subs, CV
Pearl Harbor, HI--PHNSY	3	1196/222.6	5161/4346	Nuc Ships, Subs
Portsmouth, NH--PTNSY	3	1123/388.1	6176/4070	Nuc Ships, Subs
Puget Sound, WA--PSNSY	6	2011/302.4	12753/12050	Nuc Ships, Subs, CV

**Table II-4 SPAWAR Depots**

DEPOT CODE	SIZE (SF)	COST (\$M) Facility/ Equipment	FY93/FY95 Workload (KDLH)	TYPE OF WORK
Portsmouth, VA--NESECP	.082M	3.3/6.4	522/565	Electronics
San Diego, CA--NESECS	.072M	36/40	620/650	Electronics

c. Air Force. The Air Force Materiel Command (AFMC) exercises control of Air Force depot maintenance and facilities. These depots are organized under the Technology Repair Center (TRC) and Integrated Weapon Systems Management (IWSM) concepts. The Air Force implemented the TRC concept in 1973 to consolidate the maintenance of depot-level reparable (DLRs) at specific depots along technology lines. This long standing centralization of capability is used up to, but not including, the highest end item level, i.e., type aircraft and engines. The Air Force maintains dual sources of repair for many commodities. IWSM provides a single point of contact for all weapon system platforms regardless of the number of TRCs providing that support. Table II-5 describes Air Force depots.

**Table II-5 Air Force Maintenance Depots**

DEPOT CODE	SIZE (SF)	COST (\$M) Facility/ Equipment	FY93/FY95 Workload (KDLH)	TYPE OF WORK
Ogden, UT--OO-ALC	3.7M	351.8/663.6	6890/6296	Strat Msls, Acft, Air Mun, Photo/Recon, Ldg Gear, SIMS
Oklahoma City, OK--OC-ALC	5.3M	1133.4/526.2	7366/6770	Acft, Eng, Oxygen
Sacramento, CA--SM-ALC	3.5M	633.6/503.5	6387/6032	Comm-Elec, Acft, Gnd Elec, Hyd
San Antonio, TX--SA-ALC	3.8M	372.0/648.9	7289/7202	Acft, Eng, Nuc Equip
Warner Robins, GA--WR-ALC	3.4M	257.7/850.1	7151/6605	Acft, Avionics, Props, Life Supt
Newark, OH--AGMC	.47M	243.5/301.8	1128/1106	Metrology, Nav Sys

d. Marine Corps. Marine Corps depot maintenance is controlled by the Commander, Marine Corps Logistics Bases, through the Maintenance Directorate. Marine Corps depots maintain virtually identical capabilities to provide support for Marine Corps operational units depending on unit location. The Albany, GA, depot is the primary support facility for the Maritime Pre-positioning Force. Marine Corps depots also perform much "other-than-depot" maintenance to assist organizational and intermediate maintenance organizations. Table II-6 describes both depots.

**Table II-6 Marine Corps Logistics Bases**

DEPOT CODE	SIZE (SF)	COST (\$M) Facility/ Equipment	FY93/FY95 Workload (KDLH)	TYPE OF WORK
Albany, GA--MCLBA	.52M	85/35.9	1674/1180	Amphib Veh, Wpns, Electronics, Tac Veh
Barstow, CA--MCLBB	.7M	47/23	1718/1187	Amphib Veh, Wpns Electronics, Tac Veh

e. Coast Guard. Coast Guard depots belong to the Department of Transportation, not the DOD. The Office of Engineering, Logistics and Development, through the Aeronautical Engineering Division and the Naval Engineering Division manages the depot maintenance system within the Coast Guard. Most Coast Guard depot level maintenance is performed by commercial contract. The Coast Guard depot at Elizabeth City, NC, performs 31.5 percent of aviation depot maintenance and the Coast Guard shipyard at Curtis Bay, MD, performs 18 percent of ship depot maintenance. Table II-7 describes both depots.

**Table II-7 Coast Guard Maintenance Depots**

DEPOT CODE	SIZE (SF)	COST (\$M) Facility/ Equipment	FY93/FY95 Workload (KDLH)	TYPE OF WORK
Elizabeth City, NC	.28M	87/2	500/500	Acft, Engines, Helos
Curtis Bay, MD	1M	87/50	1000/1000	Ships

3. **Service Depot Maintenance Cost Reduction Efforts.** The Services have worked to reduce the costs of depot maintenance as their force levels have been reduced. These efforts can be summarized into four categories: process improvements; competition between depots and private industry; interservicing of depot work; and reductions in depot capacity. Each of these methods is discussed in the following paragraphs.

a. **Process Improvements.** Improvements to the processes used to accomplish depot maintenance receive continuous attention by the Services. Process improvements usually are implemented without relying on cooperation from other Services or agencies. High technology processes, such as robotics and computer-assisted design and manufacturing, can yield major cost savings by reducing manpower requirements. Substantial investments may be required to install these technologies but they will be amortized by savings achieved by the system. After the first years of savings pay for the technology, the cost reductions accrued over the rest of the life of the system are pure savings for the depot maintenance budget. Non-technology-based improvements, such as maintenance

conducted under an autonomous, fully capable team concept, improve unit costs without requiring an initial investment for hardware. No savings have been separately identified for process improvement in the CBP.

b. Competition. Competition is projected to save 1,733.4 million dollars from FY91 through FY97, over 27 percent of the total CBP savings. It is a method of depot cost reduction that has been the subject of Congressional interest since at least FY91. It is important to understand some of the legislation that has affected competition in depot maintenance before examining the Services' efforts to expand competition.

(1) Legislative Background. Prior to FY91, DOD Directive 4151.1, *Use of Contractor and DOD Resources for Maintenance of Materiel*, directed the Services to normally plan for not more than 70 percent of their total depot maintenance to be conducted in Service depots in order to maintain a private sector industrial base. Navy and Marine Corps depots could compete with contractors for work offered on a competitive basis. Army and Air Force depots, on the other hand, were not permitted to compete for depot maintenance work with private industry. Since FY91, Congress has authorized all depots to compete with private industry for portions of the total depot workload under varying restrictions described in the following paragraphs.

(a) The Authorization Act of FY91 authorized the Army and Air Force to conduct a competition pilot program with an unspecified portion of the workload at one Army and one Air Force depot.

(b) The FY92 Authorization Act directed that at least 60 percent of the total depot maintenance funds expended by the Army and Air Force be used for maintenance performed at Service depots. This is known as the organic "core requirement" for depot maintenance. The FY92 Authorization Act also extended the competition pilot program through FY92 and FY93, but limited competition-eligible funds to not more than 10 percent of the non-core depot funds, or 4 percent of the total depot funds of these Services. These restrictions severely hampered Service efforts to broaden competition of the depots with private industry.

(c) The FY93 Authorization Act modified and broadened the guidelines on depot maintenance competition. The Navy was directed to maintain a 60 percent core requirement along with the Army and Air Force. For Army aviation depot maintenance only, the core requirement was reduced to 50 percent for FY93 but then increased to 55 percent for FY94, and returned to 60 percent for FY95. Although the 10 percent limitation on the amount of non-core, competition-eligible workload was rescinded, the Services were directed to not draw the competition workload disproportionately from one or several depots. Competition procedures were directed to be used if the Secretary of Defense elected to consolidate tactical missile maintenance at a single DOD location. Any depot engaged in tactical



missile activity when the Authorization Act was enacted was deemed eligible to compete. Lastly, the Services were directed to not move any workload worth more than 3 million dollars from a depot to a private facility unless competition between the depot and other facilities is used in making the selection.

(2) FY90 Service Competition Efforts. The DDMC Corporate Business Plan FY91-95 provided data on the amount of depot work awarded on a competitive basis by the Services in FY90. This data is listed in Table II-8 below. The data shows the percentage and value of depot work awarded on a competitive basis. The Army and Air Force were not authorized to compete with private industry in FY90. Navy depots were allowed to compete with industry in FY90 and the Navy offered 37 percent of its depot work for competitive bid. Other depot work for the Army, Navy and Air Force was awarded through sole-source contracts or other non-competitive means such as vendor maintenance agreements. Marine Corps depots were also authorized to compete with private industry for depot work in FY90, but no Marine Corps work was offered to contractors through competition or any other means.

**Table II-8 FY90 Depot Maintenance Competition**

Service	Pct of Depot Maint. Awarded by Competition	Value of Depot Work Awarded by Competition
Army	20 %	\$ 422 M
Navy	37 %	\$ 2808 M
Air Force	16 %	\$ 734 M
Marine Corps	0 %	\$ 0 M

Source: DDMC CBP for FY91-FY95 and OSD Report 7220.9M for FY90.

c. Interservicing. Interservicing is another major component of projected long-term CBP savings. It is projected to generate 134.7 million dollars in savings, 2 percent of total CBP savings from FY91 to FY97. Interservicing achieves cost savings by transferring work on comparable systems to the depot of another Service to take advantage of economies of scale, and to often avoid the cost of maintaining dual capabilities in a second Service. As seen in Table II-9, FY91 interservicing amounted to less than 3 percent of the overall Service depot maintenance budget with the Air Force providing 66 percent of the total. Some Services appear to do more interservicing than others. The Marine Corps and Air Force spent 9.8 and 6.1 percent respectively of their depot expenditures on work performed by other Services in FY91. The Army and Navy spent 1.4 and 1.3 percent respectively of their total FY91 depot expenditures on interservicing. The Navy total includes expenditures for ships that is a virtually unique commodity to the Navy and is precluded from significant interservicing. When expenditures for ship depot maintenance are subtracted from total Navy depot expenditures, the Navy percentage of interservicing is 5 percent. The Air Force has workloads comparable to the Navy's ships that are exempt from interservicing due to the nature of the work. These are large aircraft

(e.g., B-52s, C-5s, and C-141s) and strategic missiles. No other Service has the required facilities.

**Table II-9 Depot Maintenance Interservicing**

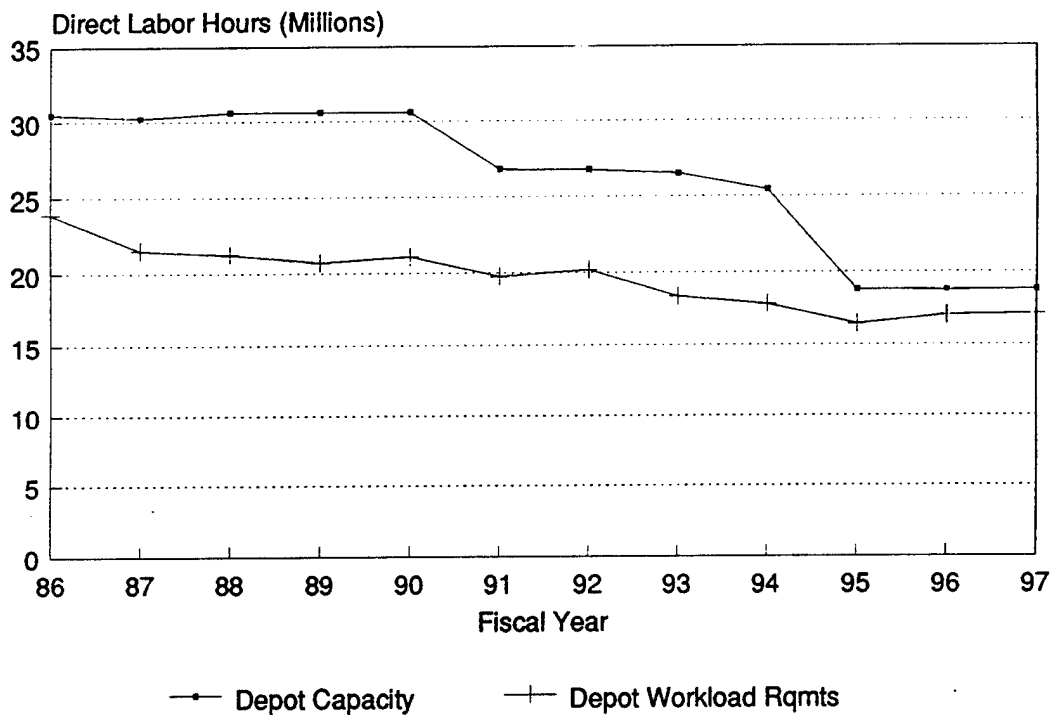
Fiscal Year	FY88	FY89	FY90	FY91
Depot Maintenance Executed (\$DM) (Millions)	13586.2	12753.3	14392.9	12809.3
Depot Maintenance Interservicing (\$DMI) (Millions)				
Army	7.5	13.9	17.5	31.3
Navy	98.7	93.9	95.2	77.8
Air Force	249.6	192.1	106.1	235.8
Marine Corps	5.8	9.8	8	13.6
Total	361.6	309.7	226.8	358.5
\$DMI/\$DM (Percent)	2.70%	2.40%	1.60%	2.80%

Source: JDMAG data from OSD Report 7220.9M

d. Capacity/Workload Reductions. Since FY88, and particularly since Base Force reductions were approved, depot workload requirements have generally decreased in the Services and are expected to continue through FY95. Figures II-1 through II-5 summarize requirements and capacity trends for each Service.

(1) The Army has embraced the "Centers of Excellence" concept in order to reduce its requirement for depot facilities. It will downsize its infrastructure in FY95 when Sacramento Army Depot closes. As shown in Figure II-1, this will reduce Army excess capacity to less than 10 percent of the downsized capacity of the remaining depots in FY97. The remaining depots still have the capability, however, to build back to higher late-1980s output levels.

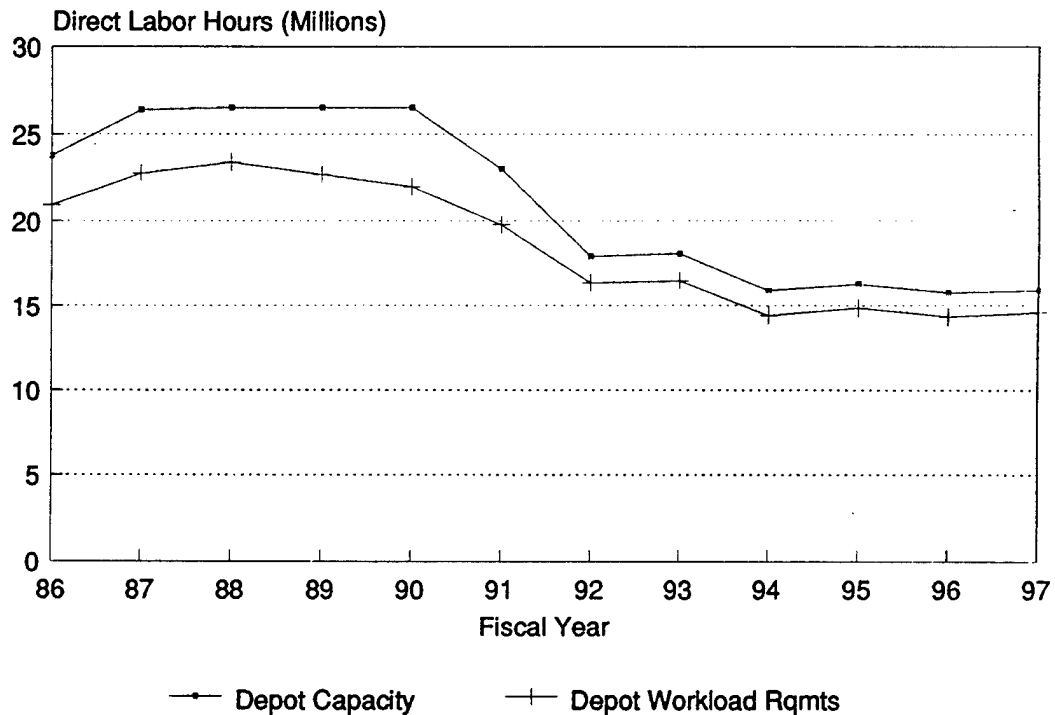
**Figure II-1 Army Capacity and Workload**



Source: JDMAG data from POS-87, POS-89, POS-90, POS-91 and DDMC CBP for FY92-FY97.

(2) NAVAIR has steadily reduced its excess capacity by downsizing without closing any depots. As shown in Figure II-2, NAVAIR capacity decreases are projected to level off in FY94. By FY97, excess capacity is less than 9 percent of the remaining capacity in NAVAIR depots. As with the Army, the potential still remains to restore some of those depots to earlier, higher production levels.

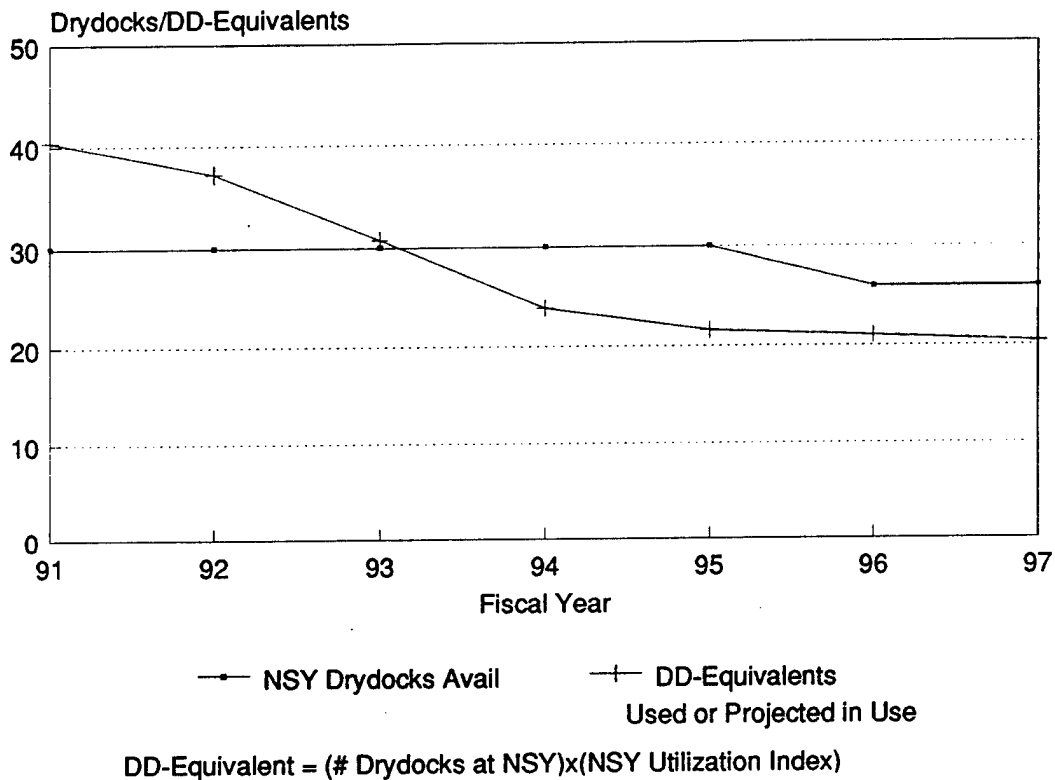
**Figure II-2 NAVAIR Capacity and Workload**



Source: JDMAG data form POS-87, POS-89, POS-90, POS-91 and DDMC CBP for FY92-FY97.

(3) NAVSEA depot capacity and work is presented in terms of their limiting physical factor, drydock utilization. As the Navy downsizes to Base Force levels, drydock requirements also decrease. Some downsizing in the shipyard infrastructure is being accomplished by the closure of the Philadelphia Naval Shipyard in FY96, as shown in Figure II-3. With no further consolidation projected, excess drydock-equivalent capacity will be more than 21 percent of that available in FY97.

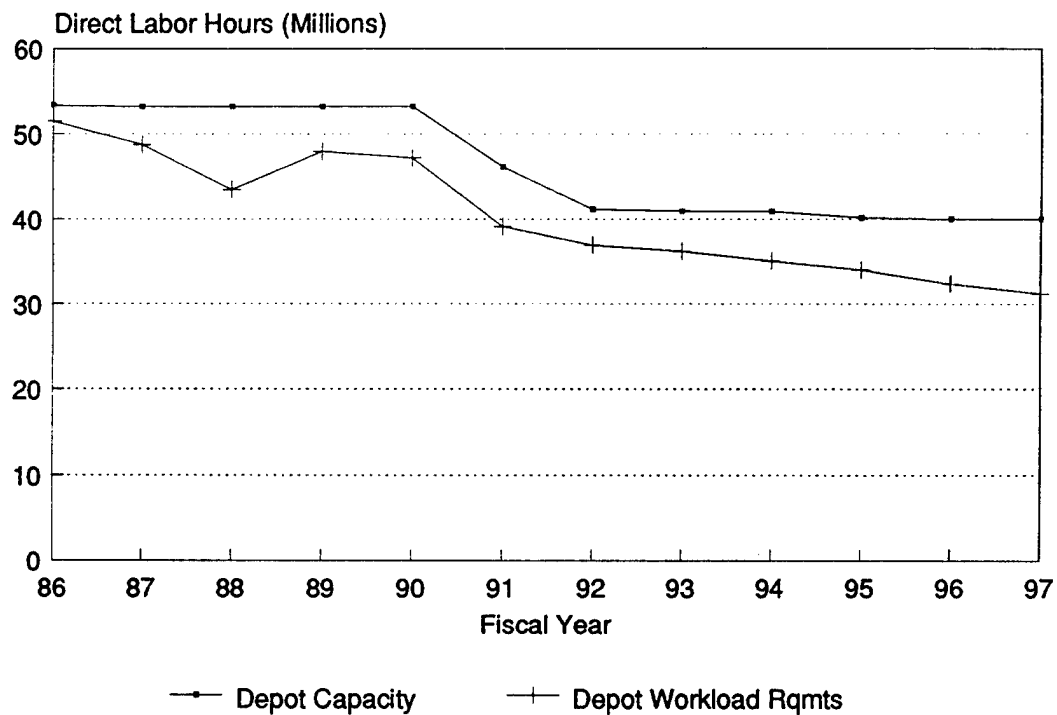
**Figure II-3 NAVSEA Capacity and Workload**



Source: JDMAG and OPNAV N431 data.

(4) The Air Force has downsized without closing depot facilities. Depot maintenance averages only about 30 percent of the logistics activity at any large ALC. Nevertheless, no complete CONUS depot maintenance function has been closed despite significant Service downsizing. The rate of decline of maintenance requirements has exceeded the rate of capacity reduction. As shown in Figure II-4, by FY97 Air Force projections indicate that depot maintenance activities will still retain over 28 percent excess capacity with an increasing trend in the percentage of excess.

**Figure II-4 Air Force Capacity and Workload**

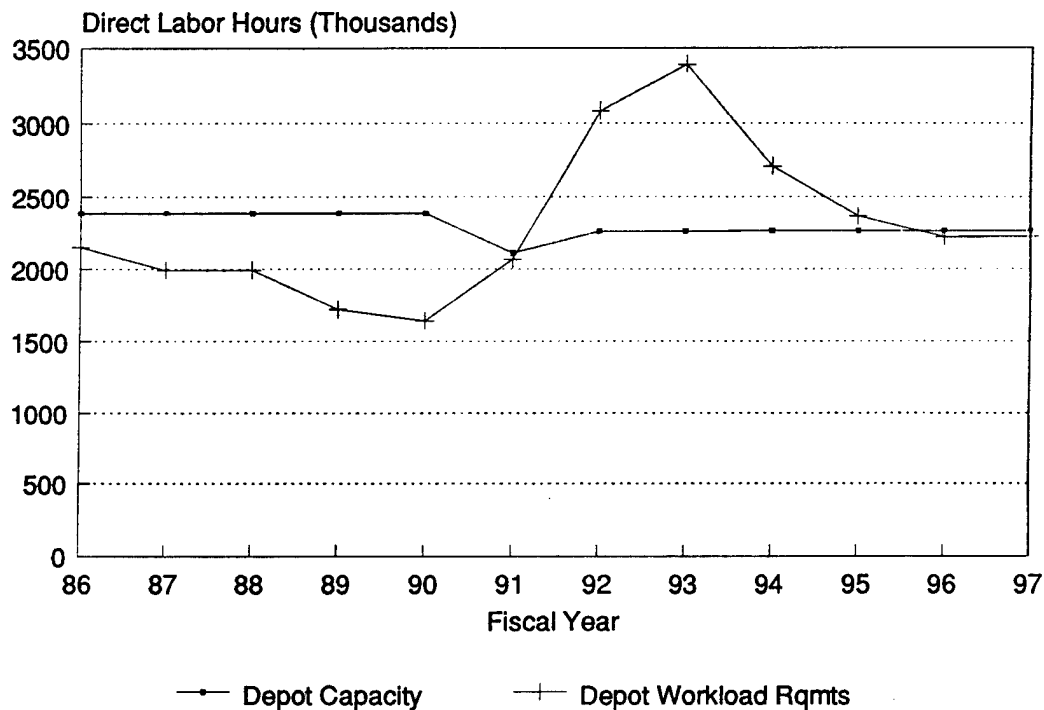


Source: JDMAG data from POS-87, POS-89, POS-90, POS-91 and DDMC CBP for FY-92-FY97.

(5) Marine Corps depot maintenance requirements fell steadily prior to FY91 Operation DESERT STORM support and reconstitution. As shown in Figure II-5, FY91 depot workload requirements increased above the nominal depot capacity to support Operation DESERT STORM. This level of effort is required through FY95 to reconstitute equipment to pre-Operation DESERT STORM readiness. To accomplish this work, the Marine Corps increased depot civilian personnel 25 percent. Workshifts were also lengthened. By FY96, the Marine Corps projects its depot requirements will normalize, although at a level 35 percent above pre-Operation DESERT STORM levels. This requirement

level is inconsistent with pre-Operation DESERT STORM trends but will reduce excess capacity at Marine Corps depots to less than 2 percent as shown in Figure II-5. If FY97 requirements leveled off at the FY90 level, the excess capacity of the Marine Corps depots would be over 35 percent. Marine Corps depot capacity is projected to remain at the same level it has been since FY86. The slight change in capacity shown in FY91 and FY92 is due to a change in the OSD's capacity calculation methodology. Like the depots of other Services, Marine Corps depots conduct many activities other than depot maintenance. This activity is not reflected for the years FY89-FY91, but apparently is for FY92-FY97.

**Figure II-5 Marine Corps Capacity and Workload**



Source: JDMAG data from POS-87, POS-89, POS-90, POS-91 and DDMC CBP for FY92-FY97.

4. Prospects of Current Depot Cost Reduction Methods and Future Opportunities. While some savings have been achieved through competition, interservicing, and capacity reduction, the potential for continued success is limited without substantial new initiatives. The following subparagraphs discuss these limitations and describe potential opportunities for additional savings.

a. Process Improvements. Faced with declining defense budgets for the foreseeable future, depot managers can be expected to take advantage of any process improvements that generate greater cost efficiency. This is true under all of the alternative depot organizations considered by this study. For this reason, process improvement will not be addressed any further in this study or used as a measure of effectiveness for the alternatives to be discussed.

b. Competition. Competition does produce unit cost efficiencies and savings in depots. Competition savings would increase if all Services maximized the depot work they award competitively, vice the limited amounts seen in the FY90 statistics. CBP competition initiatives are projected to achieve savings of less than 2 percent of the total depot maintenance budget from FY91 through FY97. Competition savings are also limited by the core requirement that ensures that at least 60 percent of depot expenditures will be spent in Service depots. One additional aspect of competition that must be carefully managed is its potential to reduce the number of potential bidders. If contracts are awarded repeatedly to the same contractors, other contractors and Service depots may dispose of unused capabilities in a manner that precludes their future competition or activation to support surge requirements. The winning contractor may evolve into the sole source of maintenance for the commodity, resulting in increased costs as opposed to savings. Despite these limitations, a significant benefit of competition is its ability to move work to more efficient private facilities and other depots. Increasing competition could shift the lower volume commodity output of less efficient, small workload depots to other facilities to take advantage of economies of scale.

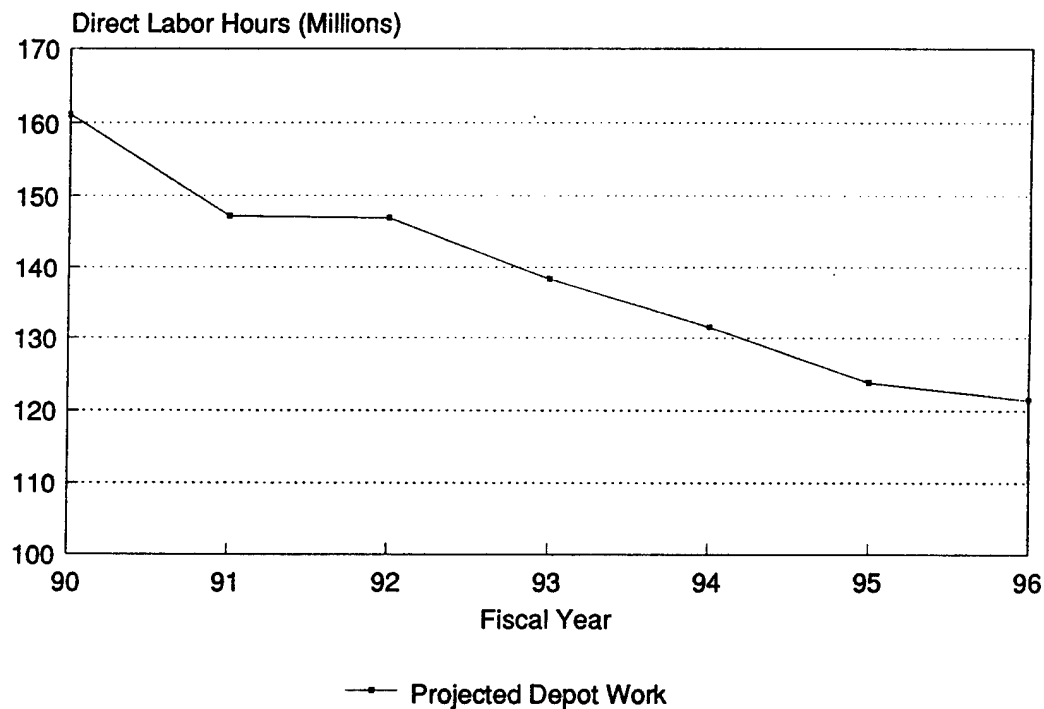
c. Interservicing. The FY91 interservicing effort described earlier achieved only 100,000 dollars in savings. In FY93, the CBP projection for interservicing savings is 23.1 million dollars rising in FY97 to 29.2 million dollars. This magnitude of savings will only be possible if all Services interservice vastly more depot work than has been previously attempted. Each Service can argue that there is a ceiling on interservicing imposed by their ownership of unique platforms. But a significant amount of similarity and commonality, particularly at the engine and component level, make interservicing potential many times greater than the current 3 percent.

d. Capacity Reductions. Reducing capacity and workload, without reducing the number of depots, decreases expenditures for direct labor and variable overhead costs, but does not significantly decrease the costs of fixed overhead expenses. As will be shown in the following paragraphs, only depot closures will result in substantial savings by eliminating the fixed overhead of depots closed.



(1) Depot fixed overhead includes those indirect costs of depot operations that do not vary with the work output of the depot. This includes general and administrative costs for depot plant operations, planning, and financial management. It also includes some of the operation's overhead costs for equipment management, production planning, engineering, material management, and quality assurance. KPMG Peat Marwick Report, Current Cost Baseline for DOD Depot Maintenance, dated 14 December 1991, estimates that all of the general and administrative costs, plus 50 percent of operations overhead, are attributable to organic maintenance management. This cost approximates total fixed overhead and is estimated to consume 28 percent of FY90 depot maintenance expenditures. Figure II-6 shows the declining trend in depot maintenance workload between FY90 and FY96 within DOD.

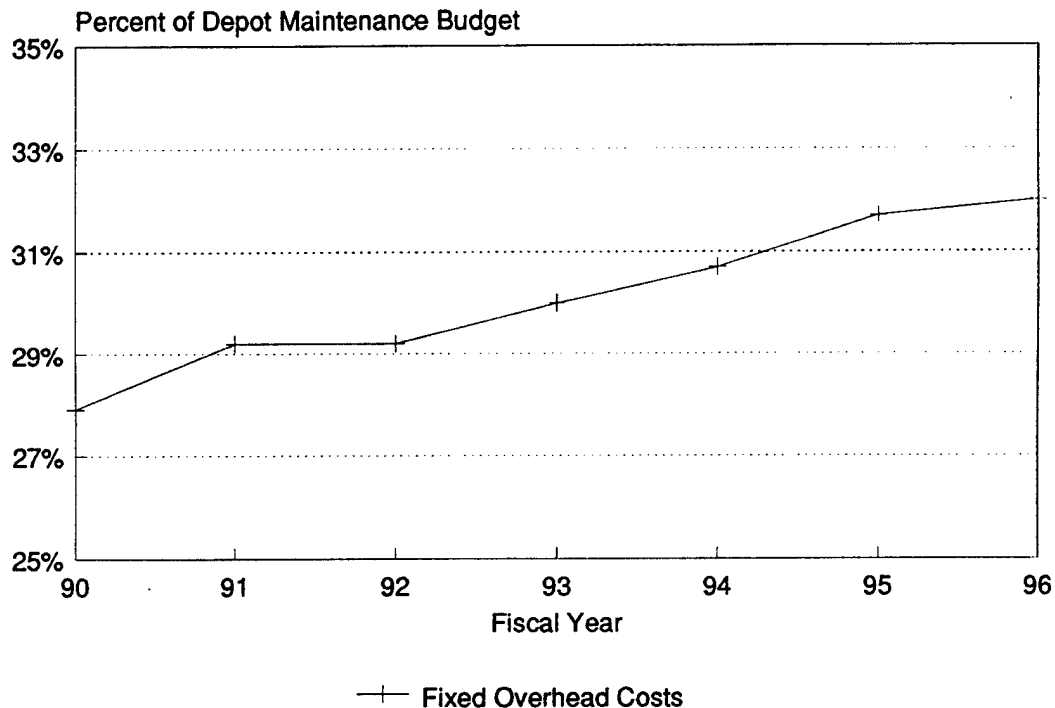
**Figure II-6 Annual Depot Maintenance Workload**



Source: JDMAG data from POS-87, POS-89, POS-90, POS-91 and DDMC CBP for FY92-FY97.

(2) Figure II-7 shows the upward trend in the percent of the depot maintenance budget being expended on the estimated fixed overhead of DOD depots during the same years. There will be a continued increase in the percentage of depot maintenance costs that are due to fixed overhead, if fixed overhead does not decrease with workload.

**Figure II-7 Depot Fixed Overhead Budget Impact**



Source: JDMAG data for POS-87, POS-89, POS-90, POS-91 and DDMC CBP for FY92-FY97.

(3) To accommodate shrinking workloads, Services have planned to reduce the commodity output of each depot, but not to significantly reduce the total number of depots. While competition and interservicing reduce costs per unit, capacity reductions have the potential to decrease the total costs for direct labor hours and variable overhead at the depots. But, like competition and interservicing, capacity reductions do not significantly decrease the substantial fixed overhead burden. Reducing capacity within the depots will push the estimated fixed overhead percentage of depot costs over 32 percent by FY96. The redundancy and excess capacity retained at each depot will have an increasingly negative impact on the funds available for depot commodity output. As future depot maintenance budgets continue to decrease and each Service needs to capture more savings, fixed indirect costs will be the prime area to reduce depot expenditures.

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## CHAPTER III - ANALYSIS METHODOLOGY

1. **Background and Assumptions.** The study analyzed seven alternatives that are summarized in the study Concept Paper, Appendix C. Two of the alternatives provide continued individual Service ownership and control of its depot maintenance organizations. Three provide varying degrees of "Executive Service" management in which the predominant Service is responsible. The two remaining alternatives remove depot maintenance responsibility from direct Service control. The first has two options: a Defense Maintenance Agency (DMA) or a Joint Depot Maintenance Command (JDMC) organization that would report, respectively, to OSD or CJCS. The second alternative provides for contracting out the entire depot maintenance operation. The analysis is based on the following two assumptions.

- a. Each Service performs work of similar quality.
- b. Changing the agency responsible for work performed in a specific location would not affect cost.

2. **Criteria.** Each alternative was evaluated using the criteria listed below. The first criterion is the only objective measure, the remainder are subjective.

- a. **Cost Savings:** Relative recurring and nonrecurring costs and savings were developed for comparison among Alternatives B through F.
- b. **Capacity Reduction:** The ability to reduce excess capacity under each alternative was compared.
- c. **Unnecessary Duplication:** A comparison of how well each alternative eliminates unnecessary duplicate capability and unnecessary duplicate overhead structure was made.
- d. **Military Responsiveness:** The loss of direct control of a Service's depot maintenance capability could potentially degrade both readiness and a Service's ability to respond to crises. The impact of each alternative with respect to its ability to maintain peacetime readiness standards, sustain forces during crisis response and contingency operations, and reconstitute forces upon redeployment was examined.

3. **Baseline Information.** The baseline information used to analyze the alternatives is contained in the Depot Commodity Matrix (Appendix F) that was constructed with data provided by OSD, the Services, and JDMAG. The Financial and Facility portion of the matrix contains 34 separate data elements to describe each depot facility. The Depot Commodity section identifies the type and quantity of work that is done at each depot. Information presented is for FY91 and has been verified by each Service as of 5 October 1992.

4. **Aggregation of Requirements and Capability.** The first step in the analysis process was to aggregate both the requirements for each major classification of hardware and the capability to meet these requirements. The Services report capacity and workload requirements by depot within the Work Breakdown Structure (WBS) in accordance with DOD Instruction 4151.15, *Depot Maintenance Program Policies*. This document groups maintenance into nine distinct categories and closely resembles the commodity breakdown identified in the commodity matrix. Table III-1 lists these groups and their subassemblies.

**Table III-1 Work Breakdown Structure (WBS)**

<b>100 Aircraft</b>	<b>200 Missiles</b>	<b>300 Ships</b>
101 Airframe	201 Frame	301 Hull
102 Engine	202 Propulsion & comp	302 Propulsion
103 A/C & Eng acc/comp	203 Guidance & comp	303 Electric Plant
104 Comm & Electronics	204 Payload & comp	304 Cmd & Surveillance
105 Armament	205 Access & comp	305 Aux
106 Supp Equip	206 Surface comm & cont	306 Outfit & Furnishing
107 Other	207 Supp and Launch Equip	307 Armament
	208 Other	308 Engineering
		309 Ship Support Svcs
<b>400 Combat Vehicles</b>	<b>500 Automotive</b>	<b>600 Construction Equipment</b>
401 Hull/body/frame	501 Hull/body/frame	601 Hull/body/frame
402 Engine	502 Engine	602 Engine
403 Veh/Eng comp/acc	503 Veh/Eng comp/acc	603 Veh/Eng comp/acc
404 Comm & Electronics	504 Comm & Electronics	604 Other
405 Armament	505 Armament	
406 Support Equip	506 Support Equip	
407 Other	507 Other	
<b>700 Electronic &amp; Comm</b>	<b>800 Ord/Weaps/Munitions</b>	<b>900 Gen Purpose Equip</b>
701 Radio	801 Nuclear	901 Rail
702 Radar	802 Chem & Bio	902 Generator Sets
703 Wire & Comm	803 Artillery & Guns	903 GP Maint tooling & equip
704 Other	804 Small Arms	904 Other
	805 Conv Arms & Explosives	
	806 Other	

Source: DODI 4151.15, Depot Maintenance Program Policies.

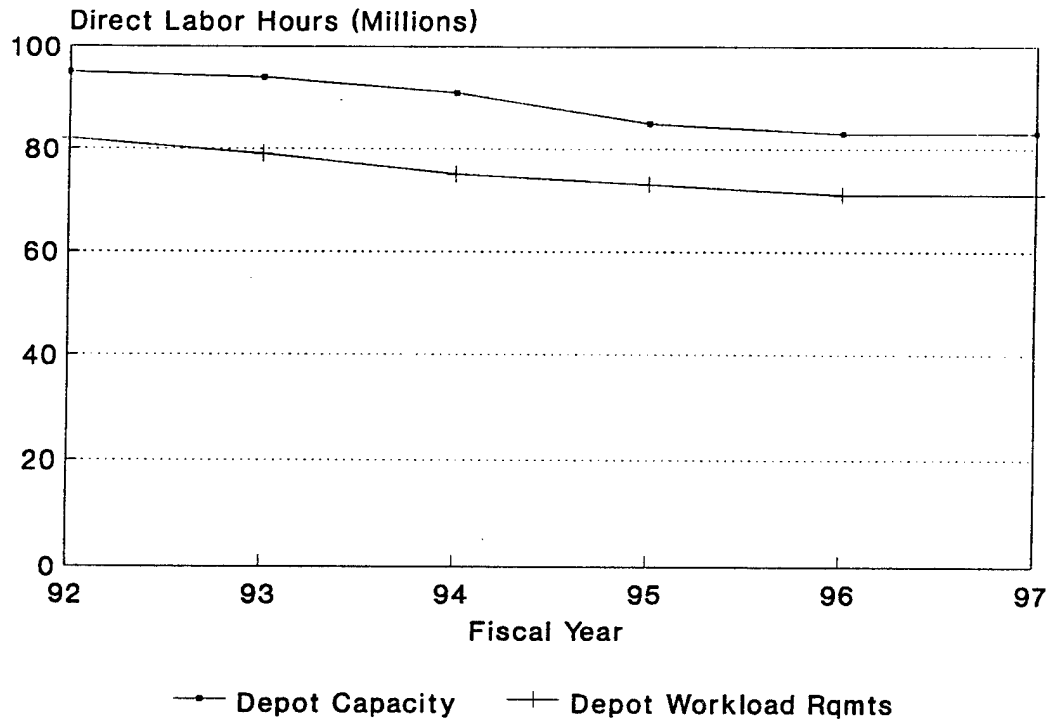
- a. Past and present capacity and FY95 workload requirements were then reviewed. Capacity is defined in DOD 4151.15-H, *Depot Maintenance and Utilization Measurement Handbook* as: "The amount of workload, expressed in actual direct labor hours (DLHs), that a facility can effectively produce annually on a single shift, 40-hour week basis while producing the product mix that a facility is designed to accommodate."

b. The formula recommended by the JLC and incorporated in DOD 4151.15-H (draft) for computing capacity is: number of work positions x availability factor (.95) x annual productive hours (1615).

c. Depot capacity is a function of the physical plant and the personnel assigned with the level of employment being the driving factor in the calculation. The only variable in the capacity formula is the number of work positions which, as defined, is not directly affected by personnel vacancies. From the purist's viewpoint, a reduction in personnel levels should only affect a depot's ability to perform up to its capacity. In reality, when faced with a loss of manpower, most depots elect not to use equipment and/or decrease shop configuration which results in reduced work positions and lower computed capacity levels.

d. Using the depot's past reported capacity and FY95 workload requirements, as reported by the Services in accordance with OSD standards in DOD 4151.15-H, analysts reviewed the overall depot maintenance capacity and the maintenance requirements for weapon systems and their sub assemblies for all Services. Figure III-1 is a summary of Service capacity and planned workload for FY92-FY97, less shipyards. Shipyards were not included, because shipyard capacity figures based upon the workload are unavailable from JDMAG. The reduction in workload is attributed to projected decreases in force structure. The reduction in capacity is attributed to the Services' efforts to optimize their depots with the largest single factor being across the board Service reductions in depot maintenance personnel. The present gap between workload and capacity does not decrease over time, based upon Service provided data.

**Figure III-1 DOD Depot Capacity and Workload Requirement (Less NAVSEA)**



Source: JDMAG

e. The capacity figures shown in Figure III-1, are based upon a single shift, eight hour, five day work week. Increasing a depot to multiple shifts would increase depot capacity and further widen the gap between computed capacity and workload requirements. For the purpose of this study, depot maintenance capacity was measured at the single shift level, allowing a multiple shift alternative to meet potential surge requirements.

**5. Identification of Excess Capacity and Dominant Service.** The second analytical step involved quantifying excess capacity and identifying the dominant Service. Excess capacity was identified by subtracting the planned FY95 workload from the FY87 capacity. This was performed at the weapon system level (e.g. WBS 100, aviation) and, where data was available, at the sub assembly level (e.g. 101, airframes). FY87 capacity figures were used since it was a peak year with larger overall employment and more accurately reflected what work a depot facility could absorb during workload consolidation. Analysts recognize that some existing depots may have been reconfigured since FY87, to reflect a lower capacity. As a result, in order to accept added workload, depots will require reconfiguring to a larger capacity. Capacity of those depots which have closed or will close by FY96 was not included. Any deviation of the above procedure will be explained in the alternatives. Depot capabilities were reviewed to determine which depots perform similar maintenance in order to identify potential consolidations. The Depot Commodity Matrix (Appendix F), DOD

7220.9-M, and the WBS data were the primary inputs used in this process. The dominant Service for each major weapon type and, where possible, their sub-assemblies was then determined by identifying the Service with the majority of documented man-hours.

**6. Identification of Costs and Savings.** The third step in the analytical process involved quantifying costs and savings. When a significant excess in capacity exists, it is possible to consolidate requirements from a single large activity, several smaller ones, or a combination of different size facilities. In several cases, depot activities perform non-depot level maintenance functions that would still be required after the consolidation of depot level maintenance. As a result, the consolidation of depot level maintenance workload may not always result in the closure of a site. For each alternative and for each WBS major group, savings and costs based on actual FY91 workload figures were estimated whenever consolidation occurred. To allow for proper planning and execution, the migration of workload would not commence until FY94 and would occur over a period of two years. Cost and savings were projected from FY94 through FY03. All costs and savings were adjusted, using FY93 constant dollars for comparison.

a. Costs. The following one time and recurring costs were calculated for each alternative:

(1) Personnel

- a. The cost of involuntary separations resulting from the transfer of a maintenance function.
- b. Personnel relocation costs. The government expense to move those personnel that will transfer with the function.
- c. Unemployment claims for personnel who are involuntarily separated.
- d. Early-out retirement costs.

(2) Temporary duty costs associated with training individuals at a new facility.

(3) Costs to move equipment to the new location.

(4) Cost of recruiting and training people at the new location.

(5) Costs associated with lower initial productivity at the new facility.

(6) Added military construction and conversion costs.

(7) Costs associated with moving Defense Logistics Agency (DLA) warehousing and Defense Reutilization and Marketing Offices (DRMO) to new locations were not



included.<sup>1</sup>

(8) Environmental clean-up costs. These costs have not been included in this analysis due to the recognition that they must be paid by DOD whether the facility remains open or is closed. However, a Base Realignment and Closure (BRAC) decision to close a facility may drive a large additional unfunded environmental charge in the near term. As a result, other interim options such as "caretaker status" or "mothballing" may be needed in lieu of closing in order to provide time to program and budget for the added environmental charges.

(9) Cost of disruption at the losing depot.

(10) Cost for closing buildings and other production facilities due to closure or relocating workload. For example, some depot maintenance facilities occupy an entire base/post. Calculating closing and transfer costs for these are straightforward. Others are combined with engineering, materiel management, inventory control points, and other Service logistic functions on large bases with other tenant organizations. In these instances cost calculations are less straightforward. When a significant entity other than a depot maintenance facility remains at a base/post, closure of the base/post has not been considered. Additionally, the analysis has not accounted for any differences in transportation recurring costs that result when workload is accomplished at a new location. These are generally a small percent of the total maintenance cost.

b. Savings. The following one time and recurring savings were calculated for each alternative:

(1) Projected and budgeted military construction that will be canceled.

(2) Industrial Plant Equipment (IPE) costs for new/replacement items that are no longer required.

(3) Indirect operational overhead and General and Administrative (G&A) savings. This includes such items as engineering, staff support, base operation and support, and work not identifiable to a single job order.

<sup>1</sup> DLA conducted a macro look at Alternative E and found a potential reduction of 1000 people with no additional facility requirements. Based on an average salary of 30,000 dollars per year, this has the potential to save as much as 30 million dollars per year. These potential savings have not been included in the analysis of any alternative. A more detailed study is required to determine actual costs and savings.

7. Summary. A summary of how each of these costs and savings items were calculated is contained in Appendix E. To the maximum extent possible, estimates of costs and savings have been taken from previous studies and audits. When previous studies' costs and savings recommendations fall into a narrow range, a single estimate has been used. When there is disparity in estimating a particular cost, a savings/cost range is used incorporating the extreme estimates from the studies available. When projected costs are subtracted from projected savings for each alternative, a savings range is then calculated. It is important to note that the saving ranges apply to all of DOD. No attempt has been made to allocate these potential savings to individual services. Further, the calculated savings ranges are useful only for comparison of Alternatives B through F and are not "budget quality" figures, i.e., they are most useful for the relative ranking of Alternatives B through F in terms of cost savings. This is due to the lack of data in a variety of areas, e.g., outyear labor rates, accurate workload estimates, and lack of demographics to more precisely estimate personnel costs.

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## CHAPTER IV - EVALUATION OF ALTERNATIVES

1. **Background.** Seven alternatives are analyzed in this report (Appendix C) using the methodology outlined in Chapter III. Excess capacity was identified by subtracting the planned FY95 workload from the FY87 capacity. FY87 capacity figures were used since it was a peak year with larger overall employment and more accurately reflects what work a depot could absorb during workload consolidation. Therefore, the capacity utilization percentages shown in this chapter should be only used to compare the alternatives and will not correspond to the projected percentages discussed in Chapter II. The excess capacity percentages in Chapter II are FY97 Service projections as contained in the CBP. Each alternative will be analyzed separately with cost/savings reflected. The alternatives being considered are grouped into three categories as depicted in Table IV-1.

Table IV-1 Categories and Alternatives

CATEGORIES	ALTERNATIVES
Using Service Control	A & B
Executive Service Control	C, D, & E
Control External to Services	F & G

### 2. **Evaluations.**

a. **Alternative A.** Each Service retains its own separate depot maintenance operations in accordance with DMRD 908 directions to increase interservicing, streamline depot operations, reduce management staffs at all levels, increase competition, team with private industry for remanufacturing/manufacturing, etc. Additional depot closures and realignments will be accomplished through the Base Realignment and Closure (BRAC) process. The Defense Depot Maintenance Council (DDMC) will provide limited oversight.

(1) **Overview.** This alternative assumes that each Service will realize the total of 6.4 billion dollars savings from FY91 to FY97 projected under CBP guidelines, with the DDMC providing management oversight. It will be very difficult for the Services to meet these goals and it is likely that they will be forced to take actions which will have severe impacts on readiness.

(2) **Analysis.** As reflected in the CBP, Services are reducing depot maintenance cost through the following:

(a) Near-term savings (downsizing work forces, facility closures, project cancellations, internal consolidations, etc.). These savings totaled 3.2 billion dollars of the 6.4 billion dollars, and represent 50 percent of the CBP total. Savings resulting from closing one CONUS and one overseas facility are included.

(b) Interservicing (transfer of a system's depot maintenance to another Service that has a facility maintaining the same or a similar system). These savings totaled 134.7 million dollars representing 2.1 percent of the CBP total.

(c) Competition (of organic depots with other depots and with private industry). Services' competition savings are projected at 1,733.4 million dollars, which represents 27.3 percent of the total savings.

(d) Elimination or storage of excess or unnecessary redundant capacity totaled 1,283.8 million dollars, which represents 20.2 percent of the total savings.

(3) Summary of Analysis Results. The CBP projects savings of 6.4 billion dollars that reduces the original projected depot maintenance budgets of the Army, NAVAIR, NAVSEA, Air Force, and Marine Corps by 7.0 percent from 89.8 to 83.5 billion dollars over FY91 through FY97.

(a) Cost Effectiveness. Table IV-2 details the distribution of the CBP savings. In comparison with all other alternatives, this is the least cost effective alternative.

**Table IV-2 Effect of DMRD 908 on Projected FY91-FY97 Depot Maintenance Budget**  
(Then Year \$ Millions)

	Original Budget Projection	CBP Savings	% Savings of Budget	% of Total CBP	Current Budget Projection
ARMY	15,080.5	1,065.8	7.0%	16.8%	14,014.7
NAVAIR	11,230.4	1,448.8	12.9%	22.8%	9,781.6
NAVSEA	34,229.9	2,108.0	6.2%	33.0%	32,121.9
USAF	28,305.2	1,708.3	6.0%	26.9%	26,596.9
USMC	967.3	28.6	3.0%	0.5%	938.7
Total	89,813.3	6,359.5	7.0%	100.0%	83,453.8

(b) Capacity Reduction. The CBP is the baseline for planned consolidations of depot maintenance functions. As discussed in Chapter III, the utilization rates shown in Table IV-3 are based on NAVSEA drydock utilization, FY91 through FY97 maximum capacities for NAVORD depots, and FY87 capacity for the Army, NAVAIR, Air Force, and Marine Corps.

**Table IV-3 Alternative A DOD Depot Capacity Utilization Rates**

Army	62%	USAF	64%
NAVAIR	56%	USMC	100%
NAVSEA	71%	NAVORD	81%

The overall utilization for the aggregate is 64 percent, which is used as the baseline utilization rate for the rest of the alternatives considered. When compared with all the other alternatives, this capacity utilization rate is the lowest.

(c) Unnecessary Duplication. The CBP is the baseline for depot consolidation, but leaves much redundancy and excess capacity throughout the depot organization.

(d) Military Responsiveness.

1. Peacetime Readiness. This alternative expends the peacetime depot maintenance budget on individual Service-managed depot organizations with limited interservicing. A higher percentage of available funds must be committed to maintaining excess capacity and unnecessary duplication within Service boundaries. Each Service will invest a higher percentage of their fixed peacetime depot maintenance budget in depot overhead and have less available for direct labor expenditures. Thus, this alternative yields the least amount of depot maintenance funds for hardware maintenance and readiness support.

2. Contingency Response, Deployment, and Reconstitution. Services believe that when they manage their own depot maintenance organization, the depots will be most responsive to their specific needs for contingency response, deployment, and reconstitution. No hard data was provided to support this contention. Surge capacity can be met by additional shifts, work hours, and workdays to meet total mobilization requirements. Excess capacity and redundancy within each Service will provide even greater support and surge capacity to the using Service when additional resources are provided for contingencies and subsequent reconstitution.

b. Alternative B. Each Service retains its own separate depot maintenance operations. Under DMRD 908 streamlining guidance, weapon system platforms, depot-level reparables (DLRs), components, and non-weapon-system equipment will be consolidated into "Centers of Excellence" within the using Service to the maximum extent possible. Depot maintenance could be performed by a contractor or in another Service's facilities.

(1) Overview. Alternative B reduces excess capacity and unnecessary duplication by increased implementation of the "Centers of Excellence" concept within using Service managed depot boundaries. Consolidations across Service boundaries and effects of increased interservicing/competition were not considered for the alternative.

(2) Analysis. The study team:

- (a) Analyzed OSD depot output data for commodities of similar technology maintained by multiple depots within each Service.
- (b) Reviewed JDMAG FY95 projected depot workload.
- (c) Reviewed JDMAG depot capacity data from FY87 through FY97 to determine utilization rates.
- (d) Projected the net cost of consolidating commodities into "Centers of Excellence" at sites that had demonstrated capacity to absorb that commodity with an objective of making other sites eligible for closure.

(3) Summary of Analysis Results. As described in Appendix G, there is significant potential for reducing excess capacity in each Service through consolidation of depot maintenance capabilities into "Centers of Excellence." In this analysis, the Army depot maintenance workload was consolidated from six depots into five. The Air Force predicted depot workload was consolidated into five vice six current facilities. The Navy depot workload was consolidated from six aviation depots into four, seven shipyards into five, and nine ordnance centers into three. The Marine Corps depot workload performed at two depots was consolidated into one.

- (a) Cost Effectiveness. For comparison with Alternatives C through F, this alternative has the potential to achieve depot maintenance cost reductions of 1,589 to 6,661 million dollars from FY94 through FY03 as shown in Table IV-4.

**Table IV-4 Alternative B FY94-FY03 -- Projected Relative Savings  
(Constant FY93 \$Millions)**

NOTE: Only for comparison with Alternatives B through F

FY	Annual		Cumulative	
	Minimum	Maximum	Minimum	Maximum
94	(752)	(220)	(752)	(220)
95	(655)	(167)	(1,407)	(387)
96	412	959	(995)	572
97	370	881	(625)	1,453
98	371	881	(254)	2,334
99	368	878	114	3,212
00	368	863	482	4,075
01	373	862	855	4,937
02	365	861	1,220	5,798
03	369	863	1,589	6,661
Total	1,589	6,661		

(b) Capacity Reduction. The consolidations made in this alternative increased utilization by 18 percent. The utilization rates shown in Table IV-5 are based on NAVSEA drydock utilization, FY91 through FY97 maximum capacities for NAVORD and Marine Corps depots, and FY87 capacity for Army, NAVAIR, and the Air Force depots.

**Table IV-5 Alternative B DOD Depot Capacity Utilization Rates**

Army	70%	USAF	76%
NAVAIR	81%	USMC	100%
NAVSEA	92%	NAVORD	100%

The overall utilization rate is 82 percent for Alternative B after all recommended consolidations. Further increases in the utilization rate would require extensive and costly establishment of new commodity capabilities at bases that have not demonstrated capacity for those commodities in past years, or consolidation of depot maintenance across Service boundaries, not considered under this alternative.

(c) Unnecessary Duplication. The consolidations recommended within each Service significantly decrease and in some cases completely eliminate duplication, but only within Service boundaries. The final depot configuration in this alternative still provides duplicate capabilities among the Services.

(d) Military Responsiveness.

1. Peacetime Readiness. When compared with Alternative A, less available funds will be spent for excess capacity and unnecessary duplication when Services consolidate to "Centers of Excellence" within Service boundaries. However, duplication and excess capacity remain when commodities are considered across Service boundaries, so each Service will still pay a higher percentage of its peacetime depot maintenance budget for depot overhead than alternatives that consolidate across Service boundaries. Alternative B will provide more depot maintenance funds than Alternative A for hardware maintenance and readiness support.

2. Contingency Response, Deployment, and Reconstitution. As indicated in Alternative A, Services prefer to manage their own depot maintenance organization. It retains more flexibility than Alternatives C through G, although this flexibility is somewhat less than Alternative A. Surge capacity can be met by additional shifts, work hours, and workdays to meet total mobilization requirements. Excess capacity and redundancy within each Service will provide even greater support and surge capacity.



c. **Alternative C.** Depot maintenance management of common or similar weapon system platforms, (e.g., ships, fixed wing aircraft, rotary wing aircraft, large missiles, etc.) would be accomplished by single Services in "Centers of Excellence". Maintenance will be performed in the single Service's facilities, another Service's facilities or contractor facilities. Depot maintenance responsibility for DLRs, components, and non-weapon system equipment will remain in using Service's "Centers of Excellence".

(1) **Overview.** Alternative C consolidates depot maintenance responsibility for each major type of weapon system platform under an Executive Service. The using Service of each weapon system retains responsibility for depot maintenance of DLRs, components, and non-weapon system equipment.

(2) **Analysis.** The study team:

- (a) Identified weapon system platform and DLR/component responsibilities for each Service.
- (b) Established a workload baseline in each commodity based on FY91 workload.
- (c) Reviewed JDMAG FY95 projected depot workload for each commodity.
- (d) Reviewed JDMAG FY87 capacities for each commodity.
- (e) Applied FY91 percentages of work to the FY95 total workload and the FY87 capacities. Marine Corps capacity was based on FY93 figures, NAVORD capacity was based on the maximum reported capacity between FY91 and FY97.
- (f) Consolidated weapon system platform commodity workloads to the maximum extent possible at the depots of the Executive Service, and DLR/component commodity workloads within the depots of the owning Services.

(3) **Summary of Analysis Results.** As described in Appendix G, the analysis found little overall capacity reduction through migration of weapon system platforms across Service lines. The majority of depot-level maintenance is performed on DLRs and components, not weapon system platforms. As a result, these Services must retain much of their current structure to perform maintenance on the remaining workload. In addition, since the Services still maintain their weapon system DLR/components, greater consolidation was not possible. For aircraft, with the majority of the airframe maintenance work migrating to the Air Force, no Air Force consolidations were possible. Navy was consolidated from six NADEPs to four, but three sites would still perform airframe maintenance since the Navy's airframe maintenance requirements exceeded the Air Force's excess capacity. The fourth NADEP would perform depot maintenance on rotary wing aircraft. Since ships/underwater ordnance capability resides solely with the Navy, no workload was transferred among the Services. Within

the Navy, the work of seven shipyards was consolidated into five and nine NAVORD depots into three. For ground vehicles/ equipment, following the migration of Marine Corps platforms to the Army, the remaining Marine Corps workload was consolidated into a single Marine Corps depot and the workload of an Army depot was consolidated within the Army depot structure. Tactical and strategic missile workloads have already been incorporated into consolidation plans and hence, no further transfers and savings are possible.

(a) Cost Effectiveness. For comparison to Alternatives B through F, this alternative has the potential to achieve depot maintenance cost reductions between 1,294 and 5,141 million dollars. Table IV-6 shows the savings by each fiscal year.

**Table IV-6 Alternative C FY94-FY03--Projected Relative Savings  
(Constant FY93 \$Millions)**

NOTE: Only for comparison with Alternatives B through F

FY	Annual		Cumulative	
	Minimum	Maximum	Minimum	Maximum
94	(631)	(527)	(631)	(527)
95	(546)	(145)	(1,177)	(672)
96	306	756	(871)	84
97	309	724	(562)	808
98	310	725	(252)	1,533
99	309	724	57	2,257
00	309	721	366	2,978
01	309	721	675	3,699
02	310	721	985	4,420
03	309	721	1,294	5,141
Total	1,294	5,141		

(b) Capacity Reduction. This alternative increases utilization of DOD depots by 24 percent from 64 percent to 88 percent. Details of each Service's capacity utilization is shown in Table IV-7.

**Table IV-7 Alternative C DOD Depot Capacity Utilization Rates**

Army	74%	USAF	76%
NAVAIR	76%	USMC	88%
NAVSEA	100%	NAVORD	100%

(c) Unnecessary Duplication. This alternative reduces much of the duplication among the Services for maintenance of similar weapon system platform

(airframe/hull/body/ frame) commodities. With each Service maintaining DLR/components independently, much duplication among the Services remains. The adoption of the "Centers of Excellence" concept by every Service will help reduce the duplication, but will not eliminate duplication totally.

(d) Military Responsiveness.

1. Peacetime Readiness. The splitting of repair responsibilities of weapon systems and non-weapon system equipment does not complement the repair cycle. This splitting of responsibilities will require increased coordination and enhances the opportunity for something to get lost in the process. As found in Alternatives A and B, the Services will continue to spend available funds to maintain excess capacity and unnecessary duplication across Service boundaries. These inefficiencies will result in reducing the amount of depot maintenance funds for hardware maintenance and readiness support.

2. Contingency Response, Deployment, and Reconstitution. Excess capacity and unnecessary duplication will provide surge capacity across the Services. This is particularly true in wartime when a majority of the requirements are for DLRs and components, rather than for platforms.

d. Alternative D. Each Service retains its own separate depot maintenance operations for weapon system platforms under the "Centers of Excellence" concept. Similar DLRs, components and non-weapon system equipment will be consolidated to the maximum extent possible in single Service "Centers of Excellence".

(1) Overview. Alternative D consolidates depot maintenance responsibility for DLRs/ components of weapon system platforms and non-weapon system equipment under an Executive Service. The using Service of each weapon system retains responsibility for depot maintenance of the weapon system platforms. The Executive Service is usually the Service that performs the largest workload of DLRs/components.

(2) Analysis. The study team:

- (a) Identified weapon system platform and DLRs/commodity responsibilities for each Service.
- (b) Established a workload baseline in each commodity based on FY91 workload.
- (c) Reviewed JDMAG FY95 projected depot workload for each commodity.
- (d) Reviewed JDMAG FY87 capacities for each commodity.

(e) Applied FY91 percentages of work to the FY95 total workload and the FY87 capacities. Marine Corps capacity was based on FY93 figures, NAVORD capacity was based on the maximum reported capacity between FY91 and FY97.

(f) Consolidated DLRs/component commodity workloads to the maximum extent possible at the depots of the Executive Service, and the weapon system platform commodities within the depots of the using Service.

(3) Summary of Analysis Results. As described in Appendix G, capacity reductions are possible across Service lines. For aircraft, the work of six NADEPs was consolidated into four. The Army would require a depot as its sole source of Army airframe repair. All aircraft DLRs/components were consolidated into existing Air Force depots. For ships/underwater ordnance, the result was the same as Alternative B, with the work of seven shipyards consolidated into five and nine NAVORD depots consolidated into three. For ground vehicles/equipment, the workload of five Army depots was consolidated into four. The Marine Corps would require one of its depots for support of its ground platforms. Tactical and strategic missile workloads have already been incorporated into consolidation plans, and further consolidations will not result in significant cost reductions under the assumptions of this model.

(a) Cost Effectiveness. For comparison to Alternatives B through F, Alternative D has the potential to achieve depot maintenance cost reductions between 1,490 and 8,148 million dollars. Table IV-8 shows the cost reduction by fiscal year.

**Table IV-8 Alternative D FY94-FY03--Projected Relative Savings**  
(Constant FY93 \$Millions)

NOTE: Only for comparison with Alternatives B through F

FY	Annual		Cumulative	
	Minimum	Maximum	Minimum	Maximum
94	(872)	(256)	(872)	(256)
95	(766)	(174)	(1,638)	(430)
96	387	1,130	(1,251)	700
97	392	1,072	(859)	1,772
98	392	1,071	(467)	2,843
99	391	1,070	(76)	3,913
00	391	1,059	315	4,972
01	392	1,059	707	6,031
02	391	1,058	1,098	7,089
03	392	1,059	1,490	8,148
Total	1,490	8,148		

(b) Capacity Reduction. The consolidations recommended increase utilization projections by 23 percent from 64 to 87 percent. Each Service's capacity utilization is shown in Table IV-9.

Table IV-9 Alternative D DOD Depot Capacity Utilization Rates

Army	90%	USAF	80%
NAVAIR	82%	USMC	53%
NAVSEA	100%	NAVORD	100%

(c) Unnecessary Duplication. This alternative reduces much of the duplication among the Services for maintenance of similar DLRs/components, but each Service must have an independent depot capability for its weapon system platforms, even when similar to other Services. While application of the "Centers of Excellence" concept will reduce this duplication within each Service, total elimination of duplication is not possible.

(d) Military Responsiveness.

1. Peacetime Readiness. The splitting of repair responsibilities of weapon systems, DLRs, and non-weapon system equipment does not complement the repair cycle. This splitting of responsibility will require increased coordination and enhances the opportunity for something to get lost in the process. As found in Alternatives A, B, and C, the Services will continue to spend available funds to maintain excess capacity and unnecessary duplication across Service boundaries, albeit to a somewhat lesser degree. These inefficiencies will result in reducing the amount of depot maintenance funds for hardware maintenance and readiness support.

2. Contingency Response, Deployment, and Reconstitution. Excess capacity and unnecessary duplication will provide surge capacity across the Services. With the primary wartime requirement being in DLRs and components, the Executive Service for these components will meet this need through additional shifts.

e. Alternative E. A single Executive Service will be responsible for the maintenance of similar/common platforms and their DLRs, components and non-weapon system equipment to the maximum extent possible under the "Centers of Excellence" concept. The "Centers of Excellence" may be located in the Executive Service's facilities, another Service's facilities or contractor facilities. Total weapon system management will be the responsibility of the using Service.

- (1) Overview. Alternative E consolidates complete depot maintenance responsibility for similar weapon system platforms and their DLR/components under an Executive Service. Table IV-10 shows the weapon system platform assignments among the Services.

**Table IV-10 Executive Service Assignment**

Army	Tactical Missiles Combat Vehicles Automotive Construction Equipment Ground Comm-Electronics Ordnance Weapons and Munitions General Purpose Equipment
Navy	Ships and Ship Components Underwater Ordnance
Air Force	Aircraft and Aircraft Components Metrology Strategic Missiles

(2) Analysis. The study team:

- (a) Assigned Executive Service responsibilities for each weapon system platform.
- (b) Established a workload baseline in each depot commodity based on FY91 workload.
- (c) Reviewed JDMAG FY95 projected depot workload for each commodity.
- (d) Reviewed JDMAG FY87 capacities for each commodity.
- (e) Applied FY91 percentages of work to the FY95 total workload and the FY87 capacities. NAVORD capacity was based on the maximum capacity reported between FY91 and FY97.
- (f) Consolidated all commodities to reduce excess capability and fully utilize the Technology Repair Center and "Centers of Excellence" concepts.

(3) Summary of Analysis Results. As described in Appendix G, significant capacity reductions are possible through consolidations across Service lines. For aviation, the work of thirteen Service aviation depots was consolidated by transferring the work of five depots into the remaining eight depots. For ships/underwater weapons, the workload of seven shipyards was consolidated into five and nine NAVORD depots were consolidated into three. After consolidation of the ground vehicles/equipment workload, five Army depots were reduced to four, as well as assuming the workload requirements of the two Marine Corps depots. For strategic and tactical missiles, no further interservice transfer would result in additional closures and savings. All Services' metrology work was consolidated at one Air Force location.

- (a) Cost Effectiveness. For comparison with Alternatives B through F, this alternative has the potential to achieve depot maintenance cost reductions of 1,761 to 9,180 million dollars from FY94 through FY03 as shown in Table IV-11.

**Table IV-11 Alternative E FY94-FY03--Projected Relative Savings  
(Constant FY93 \$Millions)**

NOTE: Only for comparison with Alternatives B through F

FY	Annual		Cumulative	
	Minimum	Maximum	Minimum	Maximum
94	(1,085)	(346)	(1,085)	(346)
95	(976)	(272)	(2,061)	(618)
96	510	1,330	(1,551)	712
97	476	1,225	(1,075)	1,937
98	476	1,223	(599)	3,160
99	476	1,225	(123)	4,385
00	472	1,200	349	5,585
01	469	1,197	818	6,782
02	472	1,200	1,290	7,982
03	471	1,198	1,761	9,180
Total	1,761	9,180		

(b) Capacity Reduction. The Executive Service alternative consolidates workloads across Service lines. Therefore, the Marine Corps and NAVAIR workloads are included in the Executive Services utilization rates. The consolidations recommended increase DOD depot utilization by 31 percent from 64 percent to 95 percent, and individual Service depot utilization as shown in Table IV-12.

**Table IV-12 Alternative E DOD Depot Capacity Utilization Rates**

Army	92%	USAF	94%
NAVAIR	consolidated	USMC	consolidated
NAVSEA	100%	NAVORD	100%

(c) Unnecessary Duplication. Aviation and ground workload is transferred into existing Technology Repair Centers and "Centers of Excellence". This eliminates duplication within and among the Services for the maintenance of aviation and ground weapon system platforms and DLR/components.

(d) Military Responsiveness.

1. Peacetime Readiness. Of the alternatives considered thus far, this alternative best meets the test of current and future budget reductions. Compared to Alternatives A, B, C, and D, Alternative E has the best potential to standardize depot production through centralized management to the component level. By closing depots to remove excess capacity across Service lines, the most depot maintenance funds of any alternative considered thus far

can be expected to be available for hardware maintenance and readiness support.

2. Contingency Response, Deployment, and Reconstitution. While Alternative E provides a centralized organization that should be most flexible to workload changes, overall surge capacity is significantly reduced and a longer period of time to reconstitute forces will be required. To meet all but Total Mobilization requirements, capacity is still available by adding additional shifts, work hours, and workdays over the 5-day/40-hour work week assumed for capacity computations.

f. **Alternative F.** All depot maintenance functions will be consolidated under a single organization external to the Services. Individual weapons platforms, DLRs, components, and non-weapon system equipment will be maintained in government owned depots or contracted out.

(1) Overview. Alternative F consolidates all depot maintenance functions under one organization external to the Services, and was evaluated as two distinct options. One option was a Defense Maintenance Agency (DMA). The other option was a Joint Depot Maintenance Command (JDMC).

(2) Analysis. The primary difference between Alternative E and the two options of this alternative is who is in charge of depot maintenance. Alternative E has three separate executives in charge. The F(DMA) option superimposes an external controlling agency on depot maintenance activities and eliminates Service control. The F(JDMC) option places central authority in the hands of a joint commander who executes his responsibilities through the Service components. It was assumed that the director of a DMA or a joint commander would be equally as vigorous and equally as effective as three separate Executive Services in bringing about consolidation, reduction in overhead, and closure of unnecessary depots. It was further assumed that the "Centers of Excellence" concept can also be maximized by either a DMA or a JDMC. No separate analysis was conducted for this alternative. It was assumed that relative cost savings, capacity reduction, and elimination of unnecessary duplication would be no less than that in Alternative E (see Tables IV-13, IV-14, and IV-15). Compared to Alternatives E and F(DMA), Alternative F(JDMC) with a direct tie between the warfighters and the "maintainers," will provide greater military responsiveness.

g. **Alternative G.** Contract out all depot maintenance requirements. Contract management would be maintained by either the Service or by a single organization external to the Services. The ultimate goal would be to include contract maintenance as part of the weapon system acquisition costs of new systems throughout their life cycle. When this alternative was analyzed for projected effects on depot efficiency and cost, it was quickly realized that the implementation of full contractor maintenance would be an



evolutionary process. Even if all depot work were put up for bid by private contractors, some DOD depots would be required to support weapon systems that do not attract bidders due to their low volume or use of older technology no longer available from commercial industry. The requirement for DOD depots is expected to decrease as force structure is decreased and quantities of replacement weapons are decreased. Further, after the first round of competitive bidding and the elimination of organic depot capability, there is a distinct probability that the commercialization process would become a sole-source environment with potentially higher costs. Finally, the size, cost, and optimal organization of the contract administration agency would be directly proportional to the size of the contracting effort and the amount of Service participation needed to provide a responsive depot system. This alternative would put the Services at a distinct disadvantage if their control of depot maintenance were completely eliminated because contract renegotiations would be required to implement changes in maintenance priorities and standards. Since profit maximization would drive private industry to size capacity solely to meet peacetime requirements, it would be difficult and costly to maintain surge capability to meet crisis and contingency requirements. Developing a contract depot maintenance organization which accounts for all these considerations requires a dedicated analysis and could be conducted as a follow-on effort to this study.

### 3. Alternative Savings Summary.

a. Table IV-13 summarizes the projected relative savings ranges for each alternative. These ranges are the result of the use of both optimistic and pessimistic cost estimates in those cases where actual data was not readily available. A review of each of the variable and fixed cost factors is in Chapter III and Appendix E.

**Table IV-13 Summary of FY94-FY03 -- Projected Relative Savings  
(Constant FY93 \$Millions)**

Alternatives	FY	Annual		Cumulative	
		Minimum	Maximum	Minimum	Maximum
B	94	(752)	(220)	(752)	(220)
	98	371	881	(254)	2,334
	03	369	863	1,589	6,661
C	94	(631)	(527)	(631)	(527)
	98	310	725	(252)	1,533
	03	309	721	1,294	5,141
D	94	(872)	(256)	(872)	(256)
	98	392	1,071	(467)	2,843
	03	392	1,059	1,490	8,148
E&F	94	(1,085)	(346)	(1,085)	(346)
	98	476	1,223	(599)	3,160
	03	471	1,198	1,761	9,180

Note: Bold face print indicates best case.

b. Table IV-14 summarizes the short-term net investment costs (investment costs less investment costs avoided) compared to long-term potential savings.

**Table IV-14 Net Short-Term Investment Costs vs Long-Term Savings FY94-FY03**  
(Constant FY95 \$Millions)

Alternatives	Net Short-Term Investment Costs		Net Long-Term Savings	
	Minimum	Maximum	Minimum	Maximum
B	<b>387</b>	1,407	1,589	6,661
C	672	<b>1,177</b>	1,294	5,141
D	430	1,638	1,490	8,148
E & F	618	2,061	<b>1,761</b>	<b>9,180</b>

Note: Bold face print indicates best case.

c. Table IV-15 summarizes Service depot facility utilization rates derived from the various alternatives.

**Table IV-15 Summary Utilization Rates**  
(Percent Utilization of Available Capacity)

	Alternatives				
	A	B	C	D	E&F
ARMY	62	70	74	90	<b>92</b>
NAVAIR	56	81	76	<b>82</b>	N/A
NAVSEA	<sup>a</sup> 71	<sup>a</sup> 92	<sup>b</sup> <b>100</b>	<sup>b</sup> <b>100</b>	<sup>b</sup> <b>100</b>
USAF	64	76	76	80	<b>94</b>
USMC	<b>100</b>	<b>100</b>	88	53	N/A
NAVORD	81	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
Overall	64	82	88	87	<b>95</b>

Notes: Bold face print indicates best case

a. Based on drydock utilization

b. Based on FY87 direct labor hours

d. The relative range of savings possible for each alternative will be discussed and compared in the following subparagraphs in the context of the overall management concept of each alternative: using Service Management, Alternatives A and B; Executive Service Management, Alternatives C, D, and E; DOD Consolidation Management, Alternatives F and G.

(1) Using Service Management Alternatives. The essential difference between Alternatives A and B is the source and timing of the savings. Alternative A assumes a total savings of 6.4 billion dollars from FY91 through FY97. All of these savings have already been deducted from the Services' budgets as part of DMRD 908. Alternative A assumes that the individual Services meet their yearly savings goals through FY97 and that no other consolidation and savings initiatives are implemented. Alternative A obtains most of its savings from the 45-60 percent of the annual depot maintenance costs that are direct expenditures. There is real doubt as to whether or not these savings can be met without serious readiness impact on the Services. Alternative B obtains most of its savings from workload consolidations and facility closures that affect the 40-55 percent of the depot maintenance budget that pays for indirect expenses. Alternative B savings that result from facility closures are long-term in comparison to Alternative A and require early added investments to make the long term savings possible. The one common ingredient in both alternatives is that both generate savings mostly from within Service boundaries. While savings tend to come from different sources, there is overlap; therefore, the savings from Alternatives A and B are not additive in any given year or in total.

(2) Executive Service Management Alternatives. Alternatives C, D, and E provide for varying degrees of Executive Service consolidations, with Alternative E consolidating both weapon system platforms and components. Alternative E provides significantly greater relative savings potential than do C or D. This is due to the fact that most Services' depots are responsible for the full spectrum of military hardware. Alternatives C and D consolidate only a portion of each depot's work and produce fewer consolidations, facility closures, and savings. Alternative E produces significantly greater savings than Alternative B. Because Alternative E considers consolidations across Service boundaries, it provides greater excess capacity reductions and eliminates unnecessary interservice duplication. Alternative E also generates savings from improvements to the repair process through the use of existing Technology Repair Centers and "Centers of Excellence".

(3) DOD Consolidation Management Alternatives. Alternative F examined maximum consolidation of depot maintenance activities under a Defense Depot Maintenance Agency or a Joint Depot Maintenance Command. The relative savings possible from these options are believed to be equal to or greater than that shown for Alternative E.

4. **Executive Summaries of Service Views.** Each Service was asked to provide their views of the seven alternatives and an executive summary of those views. Their executive summaries are provided in the following subparagraphs. Service views of the alternatives are included as Appendixes H through L.

a. **Army Executive Summary of Alternatives.**

The Army supports Alternative E for the following reasons. First, this alternative is responsive to readiness, sustainment, and reconstitution of our combat forces, while reducing capacity and duplication. Second, it is a logical management strategy, supports systems approach and maximizes cost savings. Third, this alternative can be quickly implemented and included in the BRAC 93 process. Finally, this alternative keeps the Services decisively engaged in the total logistics support of combat units during conflict. This alternative counters the DOD Consolidation initiative, which casts a purely business approach on depot support, and adds unneeded layers of bureaucracy into the depot maintenance structure.

Alternative E meets the Services requirement to train, organize, equip, and sustain our forces in response to any contingency operation. Peacetime readiness, repair/preparation of equipment to support deploying forces, sustainment to include providing personnel/equipment for a forward depot in contingency areas and reconstitution of deploying forces would all be accomplished under this alternative.

This approach to depot maintenance management is clearly the best for both weapon and non-weapon systems. Services will achieve maximum efficiencies and effectiveness from the "Centers of Excellence" concept, which will decrease the repair cost for end items and DLRs and facilitate closing depots to reduce excess capacity. It supports other Services on a system basis which facilitates support of PEOs/PMs and Service maintenance managers in acquisition, modification, field support, etc. This alternative also avoids system and depot management problems of splitting management of end items and depot level reparable (DLRs). Workloading, workload priorities, facilities maintenance/modernization, funding, and coordination with other Services are all realistic and attainable under Alternative E. This is the only alternative which clearly presents "one face to the customer".

To achieve immediate efficiencies and cost savings, implementation of this depot strategy must be included in the BRAC 93 process even if it requires some delay, e.g. 30-60 days to accommodate any required closures/realignment. Not to pursue this course of action will defer accomplishing any significant closures/realignment initiatives until the BRAC 95 window.

In summary, it is critical that the Services be allowed to aggressively execute their Title 10 responsibilities in support of our national military strategy. An external agency restricts the Services ability execute centralized command and control over organic depots.

Our roles and responsibilities can not be separated. This alternative has the advantage of providing integrated management of weapons systems essential to Army readiness.

Detailed Army positions on all the alternatives can be found at Appendix H.

**b. Navy Executive Summary of Alternatives.**

The restructured Naval forces of the future will be optimized for joint operations to operate within the littoral regions of the world in support of national policy. This strategy requires that the Navy maintain close control over the organic infrastructure which allows "cradle-to-grave" program management coupled with fully integrated life cycle support across all levels of maintenance.

Our Navy depots contain vital engineering and emergency support capabilities which must be available to meet fleet safety and readiness objectives. These capabilities are very tightly integrated both among the depots and with corresponding maintenance activities and life cycle management functions. They exist to provide urgent responses to unanticipated requirements, and represent the core industrial capabilities without which the Navy will not retain control of its own readiness.

The progress we have made during the past two years in reducing depot costs through the Defense Depot Maintenance Council and the Defense Management Review process provides a sound framework for the difficult challenges that lie ahead. We have achieved near term savings from downsizing of both direct and indirect workforces, closure of facilities, cancellation of facility projects, and internal Service consolidation of workload.

Long range actions include increased interservicing, additional competition initiatives and improved capacity utilization. Savings projected through FY97 is \$3.55 billion.

These results are based on the realities of the present environment and are wholly responsive to the future. Our present course is defined. We have actual results which verify the validity of the direction we have chosen. Alternative A provides for the mission imperatives and the greatest short and long term savings potential. It also recognizes the effect of reduced force levels and emphasizes the responsibility of each Service to use the Base Realignment and Closure process to correct any significant imbalance between projected depot-level maintenance requirements and capacity. We must stay the course.

Detailed Navy positions on all the alternatives can be found at Appendix I.

**c. Marine Corps Executive Summary of Alternatives.**

The Marine Corps multi-commodity maintenance centers are small, effective organizations geographically positioned to reduce costs and optimize responsive support to the operational commanders. These activities, primarily in direct support of Fleet Marine

Force (FMF) and Maritime Prepositioning Force readiness commitments, devote more than 80 percent of their direct labor hours to the maintenance/repair workload that is an extension of FMF capabilities and is less than total rebuild. Marine Corps maintenance centers conduct only one percent of the total annual DOD depot maintenance workload. Of this effort, 54 percent is in support of unique Marine Corps weapon systems. The remaining workload consists of a variety of small quantity, low dollar value items which if distributed to other DOD maintenance facilities would neither increase their utilization percentage nor decrease their overhead costs.

The Marine Corps had proven that more savings and greater efficiencies can be achieved through competition and increased interservicing than originally estimated in the DDMC Corporate Business Plan. In fact, as the current version of the DDMC Corporate Business Plan indicates, the Marine Corps will continue to achieve further efficiencies/savings while downsizing. Therefore, it is imperative that the Marine Corps retain the capability to satisfy the Marine Corps' statutory "force-in-readiness" mission while maintaining the surge capability required by the National Military Strategy and the Defense Planning Guidance.

Alternative A is preferred by the Marine Corps as it will allow us to exceed the current DMRD 908 savings while retaining an adequate capability to satisfy the National Military Strategy and allow the Commandant to effectively exercise his responsibilities under Title 10. Any alternative interfering with or decreasing the Marine Corps' capability to maintain and repair equipment in support of amphibious missions is unacceptable.

Detailed Marine Corps positions on all the alternatives can be found at Appendix J.

#### **d. Air Force Executive Summary of Alternatives.**

The Air Force recognized that changes to the DOD's depot system must occur. Thus, the Air Force supports Alternative E for three reasons. First, the Services retain their core logistics roles supporting readiness, sustainability, and reconstitution. Second, the greatest near and long term savings are achieved without imposing the "DOD Consolidation" alternative's overhead penalty. Last, this alternative can be rapidly implemented.

Alternative E appropriately retains the core Service roles of readiness, sustainability, and reconstitution within the Services. It promotes a single, uniformed focal point for the customer. It unites maintenance responsibilities for weapon systems/platforms/non-weapon system equipment and exchangeables under a unified management structure. Since representatives from the dominant supported Service are assigned to selected command and staff positions throughout the Executive/Single Service structure, Service parochialism is reduced.

Alternative E meets the business efficiency test of current and likely DMRDs and maximizes DOD's flexibility in economically and efficiently using its resources.

Production throughput is increased by further consolidating workloads under Centers of Excellence and Technology Repair Centers. Centralizing maintenance management promotes seamless technology insertion and integration among the Services. Depot maintenance production metrics are standardized. Unit costs and corresponding sales prices are reduced since expenses are distributed over a larger volume workload. Critical skills are retained and available to support surge requirements. Consolidation and downsizing reduce overhead and direct labor costs, the overhead to direct labor ratio, duplicative facility and equipment investments, and facility and equipment maintenance expenses. These efficiencies can be achieved quickly with minimal expense since existing Service staffs need only be realigned to implement Alternative E--vice having to create a new organizational management structure to implement the "DOD Consolidation" alternative.

In closing, the Services have an inherent role to organize, train, and equip ready, sustainable forces capable of responding to any situation affecting the security of the United States. These inseparable core roles and responsibilities must be carried out in a progressive and aggressive manner, combining military effectiveness enhancements with business efficiencies. Alternative E clearly meets these requirements while producing the greatest short and long term opportunities and benefits.

Detailed Air Force positions on all the alternatives can be found at Appendix K.

#### **e. Coast Guard Executive Summary of Alternatives.**

The Coast Guard's mission mix (Search and Rescue, Maritime Law Enforcement, Marine Environmental Protection) and the current national emphasis on Coast Guard missions have resulted in a growth period for the Service. This growth and the resultant workload that is well beyond organic capacity has yielded full utilization of Coast Guard depots. Coast Guard platforms do not have the same sophistication of technology as DOD platforms, nor do they require the expensive infrastructure necessary for nuclear ships, submarines and high performance tactical aircraft. Coast Guard depots have focused on proper execution of basic depot maintenance for platforms. Component repair, with its high capital requirements, is primarily executed under contract and interservice support agreement. More than any other Service, the Coast Guard relies on DOD interservice support. The Coast Guard depot maintenance system is optimized to integrate organic, commercial and DOD depot maintenance. The resulting Coast Guard depots, with their austere plants and basic maintenance focus, are very cost competitive. The Coast Guard believes that the optimum alternative to even further consolidate Coast Guard and DOD depot maintenance lies in competing the consolidated DOD depots against commercial facilities for the repair of aviation components and large cutter shipyard availabilities. Coast Guard participation as an "Executive Agent Service" for small vessels should be limited to the geographic areas and roles discussed in Appendix L.

Detailed Coast Guard positions on all the alternatives can be found at Appendix L.

## CHAPTER V - CONCLUSIONS

1. **General Conclusions.** The analysis of previous studies and reports, visits to Services' depots and analyses of information provided by the Services constitute the basis for several general conclusions regarding DOD depot maintenance. They are as follows:

- a. The Services are doing many things right. The separate depot maintenance systems have been responsive to changing needs and priorities largely as a result of clear, direct lines of authority and close ties to the operational units that they support. The Services have achieved near-term savings through methods which improve production processes and reduce unit costs. With a few exceptions, depots have not been closed. While the current way of doing business is not the most efficient or economical, it has provided high-quality maintenance where and when needed, in both peace and war.
- b. The current depot management structure in DOD and the Services has not resulted in substantial competition, interservicing, or reduction of capacity or duplication of effort. Significant excess capacity and unneeded duplication continues to exist throughout DOD. Services are separately repairing similar and in some cases the same items. Services continue to invest in similar new technology applications and develop separate repair capabilities for new and similar items. There is nothing to indicate that continuation of the current way of doing business will result in any significant departure from past performance.
- c. Currently, depot maintenance costs are not projected to decrease in direct proportion to decreasing force size (see Figure I-5). While some of this may be attributable to changes in resource allocation and accounting procedures, the cost of depot maintenance remains relatively stable largely because of the overhead associated with maintaining depot capacity greater than that needed to support a smaller force.
- d. About 60 percent of total depot maintenance costs are attributed to direct labor and material. The opportunity for further reductions in this area are small because budgets have already been adjusted to accommodate DMRD 908. The portion of the DOD depot maintenance budget that is most sensitive to management action, indirect costs, amounts to about 40 percent or 5 billion dollars.
- e. It is easier to measure excess capacity and to identify duplication than it is to measure military responsiveness. For the most part, information gathered regarding military responsiveness was anecdotal. There is no doubt, however, that clear lines of authority and close association between operations and maintenance activities enhance military responsiveness.
- f. Both competition and interservicing offer substantial potential for greater efficiencies and cost reductions. The greatest opportunity for consolidation and elimination of duplication, however, results from closing depots. Closures also result in the greatest cost



savings. In the short term, closures cost more, but save more in the long term.

g. Excess capacity, when measured in terms of FY95 workload against FY97 capacity projected in the DDMC FY92-FY97 Corporate Business Plan (CBP), ranges from 10 percent to approximately 28 percent depending upon Service. Excess capacity, when measured in terms of FY87 capacity against FY95 workload, ranges as high as 44 percent. FY87 was a peak workload year with larger overall employment and more accurately reflects what work a depot facility can absorb during workload consolidation. Excess capacity is significantly greater if measured against a two-shift scheme of operations as opposed to the current one-shift approach. Most likely, true excess capacity exceeds workload requirements by 25 to 50 percent. It is acknowledged, that there is no direct relationship between capacity and the number of shifts, i.e., two shifts do not provide double the capacity of a one-shift operation.

h. Significantly greater savings are possible when consolidations occur across Service boundaries. Cross Service consolidation also results in greater reductions in excess capacity and duplication. Table V-1 summarizes the relative advantages of consolidation across Service boundaries. Alternative E and the two variations of Alternative F stand out as most advantageous.

**Table V-1 Summary Comparison of Alternatives**

	Alternatives						
	A	B	C	D	E	F(DMA)	F(JDMC)
Cost Effectiveness	o	+	+	++	+++	+++	+++
Capacity Reduction	o	++	++	+++	+++	+++	+++
Unnecessary Duplication	o	+	++	++	+++	+++	+++
Military Responsiveness	o	o	-	-	-	-	o

Note: - Indicates not as good as current plan (Alt A)

o Indicates about the same as current plan

+

i. The Base Realignment and Closure (BRAC) process is the most effective and, most likely, the only way to effect the closure of depots. The Services are individually responsible to the Secretary of Defense for making BRAC recommendations. Early coordination and integration of Service proposals is essential to the identification of the best collective set of DOD facilities for retention.

j. Regardless of the action taken to reduce costs and improve efficiency in Service depot maintenance, be it process improvement, competition, interservicing, or capacity reduction, truly significant progress cannot be expected without some superior commander with the knowledge and authority to make decisions and follow through on action across Service boundaries. No matter what efforts are made, and the Services have worked the subject hard, without top-down direction they will not even be aware of the opportunities available to decrease capacity which will free up funds for higher priority needs or reduce the

overall cost of defense. There have been a number of attempts to solve the problem of a lack of top level management oversight. The most recent attempt has been the Defense Depot Maintenance Council. All attempts have been unsuccessful because they lacked a top level command authority to reduce excess capacity and duplication across Service lines.

k. Because of the turbulence involved with any reorganization and the negative effects of turbulence, any recommendation for change must result in a better way of doing business. This includes, as a minimum, the following.

(1) Business Considerations:

- (a) Must result in significant net savings.
- (b) Near-term costs must be affordable.
- (c) Savings must be verifiable according to accepted audit practices.
- (d) Future investments must consider the total maintenance and technology needs.

(2) Military Considerations:

- (a) Must preserve or enhance the Services' ability to rapidly satisfy changes in maintenance priorities for primary weapon systems and their components.
- (b) Must preserve overall materiel readiness rather than cause any increase in the downtime of equipment.
- (c) Must preserve or improve the overall maintenance process rather than degrade it.
- (d) Must enhance rather than degrade peacetime, contingency response, deployment, and reconstitution capabilities.
- (e) Must preserve or enhance the ability of operational commanders to participate in maintenance decisions that influence their warfighting capabilities.

2. Choosing Alternatives. Taking into consideration the precautions outlined at the end of this chapter, relative savings potential identified through analysis, and the general conclusions enumerated above, the following specific conclusions have been reached regarding the choice of alternatives.

a. Alternatives A and B provide neither the cost savings desired in a shrinking military economy or the framework necessary to respond to the changes expected in the future regarding the shape and size of the Services. Accordingly, a substantial departure from the current way of doing business is considered necessary.

b. Alternatives C, D, and E all provide some degree of consolidation under an Executive Service. Alternatives C and D do not yield the greater potential cost savings available under other alternatives nor do they provide the necessary framework to manage the changes anticipated in requirements. Therefore, Alternatives C and D are excluded from further consideration.

c. No final conclusions are reached regarding Alternative G, the contracting out option, except to say a shift toward more or full commercial maintenance of Service equipment is possible under any of the other alternatives and does merit further study of individual weapons systems and individual facilities sometime in the future.

d. Alternative E, which provides for consolidation across Service boundaries under designated Executive Services, and Alternative F which provides the greatest degree of consolidation under either a Defense Maintenance Agency (DMA) or a Joint Depot Maintenance Command (JDMC), offer the greatest potential for cost reductions and more flexibility to handle future changes. It appears that the Secretary of Defense has the authority under Title 10, U.S. Code to effect any of these Alternatives. DOD directives on Service functions may need to be revised. The attributes associated with Alternatives E, F(DMA), and F(JDMC) are outlined below. An "X" under the alternatives column indicates possession of the attributes described.

**Table V-2 Attributes of Alternatives**

ATTRIBUTES	ALTERNATIVES		
	E	F(DMA)	F(JDMC)
Significant up-front costs to downsize	X	X	X
Accelerates down-sizing	X	X	X
Reduces overhead	X	X	X
Savings from divestitures	X	X	X
Synergistic savings from similar technology	X	X	X
Accelerates standard business practices	X	X	X
Reduces headquarters staff	X	X	
Single manager in charge		X	X
Manageable span of control	X		X
Full Service participation			X
Direct tie to Services/warfighters			X
Single source/point of contact for depot level maintenance/readiness		X	X
Minimizes disruption and turbulence			X
Preserves Service accountability			X
Facilitates decisions on priority issues			X
Maximizes opportunity to balance investment in forces versus logistics			X

3. Cautionary Notes. A number of precautions were taken into consideration in coming to the conclusions enumerated in this chapter. Readers are urged to consider these same precautions when coming to their own conclusions regarding the information in the study.

a. It is difficult to accurately compare alternative ways of doing business because of the lack of universally applied cost accounting, performance measurement, and capacity measurement procedures. Therefore, the data analyzed varies in accuracy.

b. Depot workload beyond FY95 is largely estimated by extrapolating projected work effort associated with the Base Force structure. Thus, if force structure changes substantially, depot workload will also change. Potential cost savings will decrease or increase depending on the scope and specific nature of the force structure change. Excess capacity and utilization estimates would similarly change.

c. Various combinations of depot workload consolidations were analyzed under Alternatives B through F. Consolidation candidates were selected on the basis of historical data, Services' updates of capabilities and the Services' projected workload. Consolidation candidates were not visited or audited to verify the data analyzed. Thus, the analysis is considered very useful to draw initial conclusions but not sufficiently accurate to make depot closure or resource allocation decisions.

d. It is important to note that potential savings identified apply to all of DOD. No attempt has been made to allocate these potential savings to individual Services. The calculated savings ranges are useful only for comparison of Alternatives B through F and are not "budget quality" figures, i.e., they are most useful for the relative ranking of Alternatives B through F in terms of cost savings.

e. Finally, various consolidation combinations were analyzed to determine what effect such actions would have on capacity, duplication, and costs. While depots consolidated in various alternatives could, in fact, become candidates for closure, no final conclusions on specific depot closures are drawn. Selection of candidates for closure are more appropriately identified in the BRAC process.

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## CHAPTER VI - RECOMMENDATIONS

1. **Maintenance Depot Closures.** It is recommended that the Services coordinate and integrate that portion of their submission to the Federal Base Closure and Realignment Commission that pertains to depot maintenance facilities. A coordinated effort that truly integrates requirements and accurately reflects unneeded facilities is essential to solving the problem of excess depot capacity and unnecessary duplication of capabilities. It is further recommended that the Air Force take the lead on aviation facilities; the Navy take the lead on ships; and the Army take the lead for ground systems. All Services should be full partners in this effort.

2. **Organization for the Future.** It is recommended that a Joint Depot Maintenance Command be established. A Joint Command has all of the advantages of an Executive Service or a Depot Maintenance Agency with few of the disadvantages. The Army and the Marine Corps are organized in a manner which would require minimal effort to provide Service components. The Navy and Air Force should be able to establish component commands with minimum difficulty and without any growth in overhead. It is further recommended that the Joint Chiefs of Staff take the lead in developing the organizational structure of the Joint Command in full coordination with the Office of the Secretary of Defense. It is envisioned that the Command would be organized along the following lines:

a. **Mission.** The mission of the Commander in Chief of the United States Depot Maintenance Command (CINCDEP), shall be to provide depot level maintenance for the Department of Defense, both in time of peace and time of war. The CINCDEP will:

(1) Be the DOD Single Manager for depot maintenance, other than theater-assigned depot assets.

(2) Be responsible for consolidations, competition initiatives, workload assignments, and standardization of systems and work processes, as appropriate, to maximize efficiency of the depot system.

(3) Recommend depots for closure through the BRAC process when required (post BRAC-93).

(4) Coordinate with the Services to assure appropriate modernization of depots.

(5) Control the depot maintenance accounts of the Defense Business Operating Fund (DBOF).

b. **Forces.** The Secretaries of the Military Departments shall assign depot assets, in time of peace and time of war, to the Commander in Chief, Depot Maintenance Command.

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## Reference List

Title/Subject	Originator	Date
1970 Blue Ribbon Defense Panel's Report to the President (Extract)		
Accelerated Depot Consolidation, Volume 1	DLA	14-Aug-92
Accountability and Control of Materiel at Depot Maintenance Facilities-Rpt# 91-034	DOD IG	29-Jan-91
Accuracy of Contract Depot Maint. Unit Sales Prices-Rpt# 91062016	AF Audit Agcy	28-May-92
Accuracy of Depot Repair Cycle Flow Times to Compute Repair and Buy Requirements for Exchangeable Assets-Rpt# 88062041	AF Audit Agcy	27-Feb-89
Accuracy of Intransit Control Time for Maintenance Recoverable Assets-Rpt# 90062041	AF Audit Agcy	3-Jun-91
Acquisition Management of C-5B Initial Spares and Depot Support Equipment Software-Rpt# 85063021	AF Audit Agcy	24-Sep-87
Adjustments of Depot Purchased Equipment Maint. Exchangeables Repair Requirements-Rpt# 89061012	AF Audit Agcy	18-Dec-89
Aircraft Depot Maintenance: A Single Manager is Needed to Stop Waste	GAO	12-Jul-78
Aircraft Depot Maintenance Programs-Rpt# 91-098	DOD IG	17-Jun-91
ALC Support of Overseas Maintenance Contractors-Rpt# 86062041	AF Audit Agcy	9-Oct-86
Alloc & Funding of Depot Repair Capability within the Air Force-Rpt# 85062012	AF Audit Agcy	4-Dec-86
An Econometric Approach to Capacity Utilization (draft)	DDMC (LMI)	1-Jul-92
An Econometric Approach to Est Productn Cost at Naval Avn Depots (Depot Automated Econometric Sys)	NavAir Sys Comd	20-Jun-89
Analysis of Depot Maintenance Interservicing (DMI) and Joint Contracting in DOD from FY81-FY86	OASD(P&L)	Sep-87
Army Warranty Program US Army Aviation System Command-Rpt# MW 91-203	Army Audit Agency	18-Jun-91
Base Operating Support Costs for DOD Depot Maint. Activities	LMI	1-Sep-92
Capacity and Utilization of DOD Maintenance Depots-Rpt# 92-127	DOD IG	14-Aug-92
Capacity Measurement Improvement Study Report	JLC	5-Dec-90
Command Brief-Defense Logistics Agency	OSD	Undated
Command Information Digest (FOUO)	AF Log Command	31-Mar-92
<b>Commodity Studies</b>		
Bearing Study	DDMC	3-May-91
Combat, Artillery and Tactical (CAT) Vehicles Depot Maintenance Study	DDMC	31-Jan-91
Conventional Munitions Depot Maintenance Study	DDMC	31-Jan-91
DOD Small Arms Study	DDMC	22-Jan-91
DOD Tactical Missile Study	DDMC	18-Jan-91
Fixed-Wing Aircraft Study	DDMC	May-91



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Flexible Computer Integrated Manufacturing (FCIM) Study Team Report	DDMC	22-Jan-91
Gas Turbine Engines and Compressors Depot Maintenance Study	DDMC	31-Jan-91
Gas Turbine Engine Blade and Vane Depot Study	DDMC	22-Jan-91
General Purpose Equipment Depot Maint. Study	DDMC	31-Jan-91
Ground Communications and Electronics Depot Maintenance Study	DDMC	16-Jan-91
Industrial Plant Equipment (IPE)	DDMC	17-Jan-91
Joint Service Engine Study	DDMC	Jan-91
Landing Gear Consolidation Study - Final Report	DDMC	22-Jan-91
Rail Equipment Depot Maintenance Study	DDMC	31-Jan-91
Rotary Wing Depot Maintenance Study	DDMC	31-Jan-91
RPV/UAV Depot Maintenance	DDMC	Jan-91
Tactical Missile Maint. Consolidation Plan for Letterkenny Army Depot-Rpt# DRAFT	DDMC	30-Apr-92
(Type I Metrology)-A Study of the Services Primary Standards Labs	DDMC	29-Jan-91
Consumable Repair Part Support for Air Force Depot Maintenance-Rpt# 87-226	DOD IG	26-Aug-87
Contract Depot Maintenance Fort Monmouth, NJ-Rpt# NR 92-208	Army Audit Agncy	26-Jun-92
Contract Depot Maintenance US Army Missile Command, Redstone Arsenal, AL-Rpt# CR 92-200	Army Audit Agncy	24-Jan-92
Corporate Business Plan FY 91-95	DDMC	Dec-91
Corporate Business Plan FY 92-97	DDMC	Nov-92
Cost Baseline for DoD Depot Maintenance (FOUO)	Peat Marwick	14-Dec-91
Cost Comparability Handbook	DDMC	23-Jan-92
Defense's Planned Implementation of \$77B Defense Business Operations Fund	GAO	30-Apr-91
Depot and Base-Level Management of Delinquent & Discrepant Materiel Shipments-Rpt# 90061045	AF Audit Agcy	4-Sep-91
Depot Level Maintenance Factors Used to Compute Spare Rqts-Rpt# 86061016	AF Audit Agcy	28-Mar-88
Depot Maintenance-Rpt# HQ 87-203	Army Audit Agncy	15-Sep-87
Depot Maintenance Anniston Army Depot-Rpt# SO 87-203	Army Audit Agncy	23-Sep-87
Depot Maintenance Competition - History and Current Status of Legislative Actions	N431C	10-Sep-92
Depot Maintenance Competition Program-Rpt# 91062020	AF Audit Agcy	17-Apr-92
Depot Maintenance Interservice (DMI) Study on Heavy Combat Tracked Vehicles	JLC	30-Sep-92
Depot Maintenance Interservicing Study	LogSysAnal Off	Dec-84
Depot Maintenance Letterkenny Army Depot-Rpt# NE 88-212	Army Audit Agncy	3-Aug-88

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Depot Maintenance Material Requirements-Rpt# 89062011	AF Audit Agcy	25-May-90
Depot Maint. US Army Tank-Automotive Command-Rpt# EC 88-2	Army Audit Agncy	19-Nov-87
Depot Maintenance Work Load Management-Rpt# 90-081	DOD IG	7-Jun-90
Depot Productivity Programs Letterkenny Army Depot-Rpt# NR 92-12	Army Audit Agncy	11-May-92
Depot Profiles 1991		
Development & Use of AF Engineered Maintenance Labor Stds-Rpt# 87062011	AF Audit Agcy	28-Jun-89
Development of Depot Maintenance Programs, US Army Armament, Munitions, and Chemical Command, Rock Island, IL-Rpt# MW 91-6	Army Audit Agncy	29-Mar-91
DMRD 908 (FOUO) Consolidation of Aeronautical Depot Maintenance-Rpt# 908	OSD	Undated
DMRD 908 (FOUO) Ship Depot Maintenance-Rpt# 908	OSD	16-Dec-91
DMRD 908 (FOUO) Consolidating Depot Maint.-Rpt# 908	OSD	17-Nov-90
DMRD 908C(FOUO) Consolidating Depot Maint.Rpt# 908C	OSD	12-Jan-91
DMRD 909 (FOUO) Consolidation of Non-Aircraft Depot Maintenance-Rpt# 909	OSD	9-Nov-89
DMRD 918 (FOUO) Defense Information Infrastructure-Rpt# 918	OSD	15-Sep-92
DMRD 919 (FOUO) Navy DMR Proposal-Rpt# 919	OSD	9-Nov-89
DMRD 936 (FOUO) Army DMR Proposals - Phase II-Rpt# 936	OSD	Undated
DMRD 995 (FOUO) Consolidation of Industrial Plant Equipment (PE)-Rpt# 995	OSD	17-Nov-90
DOD 4151.15-H Depot Maintenance Capacity and Utilization Measurement Handbook-Rpt# 4151.15-H	ASD(P&L)	Undated
DOD 5025.1-1 DOD Directives System Annual Index- Rpt# 5025.1-1	OSD	Jan-92
DoDD 4151.1 Use of Contractor and DOD Resources for Maintenance of Materiel-Rpt# 4151.1	ASD(MRA&L)	15 Jul 82
DoDD 4151.16 DOD Equipment Maint. Program-Rpt# 4151.16		23 Aug 84
DoDD 4151.18 DOD Maint. of Military Materiel-Rpt# 4151.18	ASD(P&L)	12-Aug-92
DoDD 5100.1 Functions of the Department of Defense and Its Major Components-Rpt# 5100.1	OSD	25 Sep 92
DoDD 5105.22 Defense Logistics Agency-Rpt# 5105.22	DA&M	6-Dec-88
DoDD 5128.32 Defense Depot Maintenance Council-Rpt# 5128.32	ASD(P&L)	7 Nov 90
DoDI 4151.15 Depot Maint. Programming Policies-Rpt# 4151.15	ASD(MRA&L)	22 Nov 76
DRAFT Corporate Business Plan FY 92-97	DDMC	Oct-92
Followup-ALC Support of Overseas Maintenance Contractors- Rpt# 88062014	AF Audit Agcy	23-Dec-88
Followup-Alloc & Fund of Depot Repair Capability within AF-Rpt# 87062015	AF Audit Agcy	9-May-88
Followup-C-5 Engine Intermediate Maintenance-Rpt# 89063023	AF Audit Agcy	24-Nov-89

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Followup-Maint. Inventory Center Requisitioning and Back Order Validation Procedures-Rpt# 89061014	AF Audit Agcy	13-Jul-89
Followup-Mgt of Assets Due in from Repair @ Depot Maintenance Activities-Rpt# 88062016	AF Audit Agcy	20-Dec-88
Followup-Mgt of Flow Times & Floating Stock for Engs in Depot Repair-Rpt# 88062013	AF Audit Agcy	21-Apr-89
FY92-FY97 Defense Depot Maintenance Council Corporate Business Plan Summary of Changes	JDMAG	4-Nov-92
Implementation of Competition for Aircraft Rework-Rpt# 44-C-92	Naval Audit Svc	25-Mar-92
Implementation of the UNIFIED COMMAND PLAN	CJCS	24-Apr-92
Improving the Efficiency of the Marine Corps Logistics System - Research Memorandum-Rpt# CMR 85-118	CNA	1-Nov-85
Improving the Management of DOD Aeronautical Depot Maint. Resources-(decision memorandum)	ASD(MRA&L)	11-May-82
Information Paper: Defense Information Infrastructure- DMRD 918 (FOUO)	J-4/SCAD	16-Sep-92
Information Systems Reviews AMC Systems Integration & Management Activity, St Louis, MO-Rpt# MW 91-5	Army Audit Agncy	15-Feb-91
Issues in Management & Restructuring to Support a Downsized Military	GAO	26-Mar-92
Joint Logistics Commanders' Organization	JLC	Sep-92
Joint Services - Combined Airframe, Helicopter, Engine Study - Areas of Concern	Airframe/Helo Stdy	2-Jun-83
Maintenance Facility Project Tooele Army Depot-Rpt# WE 91-13	Army Audit Agncy	13-Feb-91
Management of Aircraft Depot Maintenance Activities by the Department of Defense	98th Congress	8-Mar-83
Management of B-1B Maintenance Support Elements- Rpt# 87063012	AF Audit Agcy	17-Nov-88
Mngmt. of Contract Depot Missile Maint. Activities-Rpt# 90062018	AF Audit Agcy	28-Feb-91
Mngmt. of Organic Depot Facilities-Info. Memorandum	Sec of Air Force	12-Aug-92
Management of the Depot Maintenance Quality Assurance Program-Rpt# 89062016	AF Audit Agcy	20-Sep-90
Management of the T56 Engine Maint. Program-Rpt# 89062014	AF Audit Agcy	10-Jul-90
Marine Corps Materiel Acquisition and Support Study- Rpt# CRM 89-70	CNA	1-Jul-89
Marine Corps Options Paper	HQ, USMC	11-Apr-90
Materiel Change Management Program Tank- Automotive Command-Rpt# NR 92-11	Army Audit Agncy	8-May-92
Medical Maintenance Operations Division - US Army Medical Materiel Agency-Rpt# NR 92-14	Army Audit Agncy	22-Jun-92
Memo - BASE CLOSURES: Possible Improvements to the Cost of Base Realignment Action Model	DOD IG	26-Jun-92

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Memo - Strengthening Depot Maintenance Activities	DepSecDef	30-Jun-90
Memo - Strengthening Depot Maintenance Activities	Army/Navy/AF	28-Sep-90
Memo- Final Quick-Reaction Report on the Accountability & Control of Reclaimed B-52 Assets-Rpt# 90-078	DOD IG	31-May-90
Memo- Report of the Audit of Economy of Repair Decisions for Centrally Managed Items-Rpt# 88-175	DOD IG	30-Jun-88
Memo- Report of the Audit of Supply Support of Aviation Components Awaiting Parts-Rpt# 91-074	DOD IG	30-Apr-91
Mgt of Conventional Air, Surface & Underwater Ammunition-Rpt# 65-W-91	Naval Audit Svc	27-Sep-91
Mismanagement of Aircraft Depot Maintenance Activities by the Department of Defense	98th Congress	8-Nov-83
Navy Maintenance-Naval Aviation Depots' Asset Capitalization Program Needs Improvement-Rpt# GAO/88-134	GAO	1-Apr-88
Navy Maintenance-Public/Private Competition for F-14 Aircraft Maintenance-Rpt# GAO/92-143	GAO	1-May-92
Non-Avn Repairable Assets @ Navy Avn Depots-Rpt# 37-N-91	Naval Audit Svc	29-Apr-91
Nunn Speech on Roles and Missions	JCS LA	2-Jul-92
Overview Briefing given to Joint Depot Maintenance Analysis Group	J-4/SCAD	9-Sep-92
Performance Measurement System Report (1QFY90 thru 4QFY91)	JPCG	
Phased Organic Depot Maintenance of Aviation Weapon Systems-Rpt# 90-100	DOD IG	15-Aug-90
Planning & Use of Depot Field Teams-Rpt# 85062016	AF Audit Agcy	15-Jan-87
Pricing and Billing of Technical Assistance Sold to Foreign Military Sales Customers-Rpt# 90-106	DOD IG	5-Sep-90
Production Mngmt. of Industrial Fund Contracts-Rpt# 87062016	AF Audit Agcy	1-Sep-88
Profile of DOD Maintenance Workforce, 3d Edition	OASD P&L	1-Dec-91
Programmed Depot Maintenance (PDM)-Rpt# PN92-616	AFIG	31-Jul-92
Programmed Depot Maintenance (PDM) Expenditures and Production Reporting-Rpt# 91062041	AF Audit Agcy	21-May-92
Programmed Depot Maintenance for Phasing Out F-4 Aircraft-Rpt# 87061019	AF Audit Agcy	13-May-88
Recoverable Spares & Maint Orgns Needed for F108 Eng Spt-Rpt# 88061023	AF Audit Agcy	11-Jul-89
Report DOD Aeronautical Depot Maintenance Study-Bckgrnd & Forces to be Supported, Vol 2 of 4	OASD(I&L)	May-65
Report DOD Aeronautical Depot Maintenance Study-Facility Capacity, Investments & Workload Req, Vol 3 of 4	OASD(I&L)	May-65
Report DOD Aeronautical Depot Maintenance Study-Maint. Programs and Cost Summaries, Vol 4 of 4	OASD(I&L)	May-65

Title/Subject	Originator	Date
Report DOD Aeronautical Depot Maintenance Study- Resume, Vol 1 of 4	OASD(I&L)	May-65
Report of DOD Depot Maintenance Study Group, Vol I, Parts I-VIII	OSD	Jan-72
Review of Capital Equip Accting and Repting Procedures in Depot Maint Svc, AF Indust. Fund-Rpt# 90053015	AF Audit Agcy	4-Mar-91
Review of Maintenance Concepts for Overhauling Acft Engines-Rpt# 87062013	AF Audit Agcy	3-Jul-89
Review of the Defense Depot Maintenance Council-Talking Paper	CPT BURNS	7-Oct-92
SecAF Memo-Management of Organic Depot Facilities	Sec of Air Force	12-Aug-92
Selected Chronology of Significant Events assc'd with Improving Joint Coop. DOD Depot Maint.	DDMC	none
Selected Chronology of Significant Events Assn with Improving Joint Coop. in DOD Depot Maint.		Undated?
Spares Support for Aircraft Programmed Depot Maintenance-Rpt# 90061011	AF Audit Agcy	13-Sep-91
Streamlining Depot Maintenance	OASD(P&L)	Undated
The Army Warranty Program - Tank-Automotive Command-Rpt# EC 91-300	Army Audit Agency	19-Feb-91
The Foreign Military Sales Administration Fund-Rpt# 90-059	DOD IG	18-Apr-90
Un definitized Contract Actions, US Army Armament, Munitions, and Chemical Command (AMCECOM), Rock Island, IL-Rpt# NR 92-204	Army Audit Agency	22-Jan-92
Unified Action Armed Forces (UNAAF) [Formerly JCS Pub 2]	JCS	1-Dec-86
Use of Depot Processing and In-Transit Times in Recoverable Spares Rqrmnts. Computations-Rpt# 91061020	AF Audit Agcy	4-Jun-92

## **GLOSSARY ACRONYMS/ABBREVIATIONS**

**AFMC - Air Force Materiel command**

**AGMC - Aerospace Guidance and Metrology Center**

**ALC - Air Logistics Center**

**AMARC - Aircraft Maintenance and Regeneration Center**

**AMC - Army Materiel Command**

**ANAD - Anniston Army Depot**

**BRAC - Base Realignment and Closure**

**CBP - Corporate Business Plan**

**CCAD - Corpus Christi Army Depot**

**CHNSY - Charleston Naval Shipyard**

**CJCS - Chairman of the Joint Chiefs of Staff**

**CNO - Chief of Naval Operations**

**COE - Center of Excellence**

**CONUS - Continental United States**

**DBOF - Defense Base Operating Fund**

**DCM - Depot Cost Model**

**DDMC - Defense Depot Maintenance Council**

**DESCOM - Depot System Command**

**DepSecDef - Deputy Secretary of Defense**

**DLA - Defense Logistics Agency**

DLH - Direct Loabor Hours

DLR - Depot Level Reparable

DM - Depot Maintenance

DMA - Defense Maintenance Agency

DMDC - Defense Manpower Data Center

DMI - Depot Maintenance Interservicing

DMRD - Defense Management Report Decision

DOD - Department of Defense

DRMO - Defense Reutilization and Marketing Offices

G&A - General and Adminstrative

GAO - General Accounting Office

GOCO - Government Owned, Contractor Operated

GOGO - Government Owned, Government Operated

IPE - Industrial Plant Equipment

IWSM - Integrated Weapon Systems Management

JCS - Joint Chiefs of Staff

JDMAG - Joint Depot Maintenance Analysis Group

JDMC - Joint Depot Maintenance Command

JLC - Joint Logistics Commanders

KDLH - Thousand Direct Labor Hours

LBNSY - Long Beach Naval Shipyard

LEAD - Letterkenny Army Depot

MCLBA - Marine Corps Logistics Base, Albany, GA  
MCLBB - Marine Corps Logistics Base, Barstow, CA  
MINSY - Mare Island Naval Shipyard  
NADEP - Naval Aviation Depot  
NADEP-ALMD - Naval Aviation Depot, Alameda, CA  
NADEP-CHYPT - Naval Aviation Depot, Cherry Point , NC  
NADEP-JAX - Naval Aviation Depot, Jacksonville, FL  
NADEP-NORIS - Naval Aviation Depot, North Island, CA  
NASEP-NORVA - Naval Aviation Depot, Norfolk, VA  
NADEP-PNCLA - Naval Aviation Depot, Pensacola, FL  
NAVAIR - Naval Air Systems Command  
NAVORD - Naval Ordnance  
NAVSEA - Naval Sea Systems Command  
NCA - National Command Authority  
NESEC - Naval Electronic Systems Engineering Center  
NESECP - Naval Electronics Systems Engineering Center, Portsmouth, VA  
NESECS - Naval Electronics Systems Engineering Center, San Diego, CA  
NNSY - Norfolk Naval Shipyard  
NSWC - Naval Surface Weapons Center  
NSY - Naval Shipyard  
NUWC - Naval Undersea Warfare Center  
O&M - Operation and Maintenance



OC-ALC - Oklahoma City Air Logistics Center

OO-ALC - Ogden Air Logistics Center

OSD - Office of the Secretary of Defense

PHNSY - Pearl Harbor Naval Shipyard

POS - Program Objective Summary

PSNSY - Puget Sound Naval Shipyard

PTNSY - Portsmouth Naval Shipyard

SA-ALC - San Antonio Air Logistics Center]

SM-ALC - Ascramento Air Logistics Center

SOF - Special Operations Forces

SPAWAR - Space and Naval Warfare Systems Command

TEAD - Tooele Army Depot

TOAD - Tobyhanna Army Depot

TRC - Technology Repair Center

WBS - Work Breakdown Structure

WR-ALC - Warner Robins Air Logistics Center

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